



DRAFT

*Schnitzer ASD Yard
Riverbank Feasibility Study
Gunderson Facility
4350 NW Front Avenue
Portland, Oregon*

Prepared for:
Gunderson, LLC

September 30, 2014
1935-03.024



*Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson Facility
4350 NW Front Avenuet
Portland, Oregon*

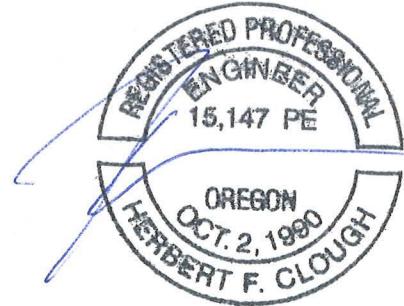
Prepared for:
Gunderson, LLC

September 30, 2014
1935-03.024

DRAFT



Carmen Owens
Senior Staff Engineer



EXPIRES: DEC. 31, 2015

Herb Clough, P.E.
Principal Engineer

Table of Contents

1.0 INTRODUCTION	1
1.1 Purpose	1
1.2 Regulatory Framework	1
1.3 Report Organization	1
2.0 BACKGROUND	2
2.1 Site Description	2
2.2 Historical Site Use	3
2.3 Soil Conditions.....	3
2.4 Groundwater Conditions.....	4
2.5 Surface Water Conditions.....	4
2.6 Upland Investigations	4
2.7 Summary of Source Control Evaluation.....	4
3.0 NATURE AND EXTENT OF CONSTITUENTS OF CONCERN.....	6
3.1 Compile SLVs and Hot Spot Levels.....	6
3.2 Compile Soil Data.....	8
3.3 Identify COPCs.....	9
3.4 Identify COCs	9
3.5 Identify COCs Present Above Hot Spot Levels	10
3.6 Lateral Extent of Soil with COCs above SLVs and Hot Spot Levels.....	10
3.7 Vertical Extent of Soil with COCs above SLVs	12
4.0 SITE MODEL	13
4.1 Locality of Facility	13
4.2 Summary of Nature and Extent of Constituents of Concern	14
4.3 Existing Conditions	14
4.4 Site Use	14
4.5 General Riverbank Stability for FS Analysis	15
4.6 Portland Harbor Activities	15
4.7 Waste Considerations	15
5.0 SOURCE CONTROL OBJECTIVES AND EVALUATION CRITERIA.....	16
5.1 Source Control Objectives	16
5.2 Evaluation Criteria	17
6.0 SOURCE CONTROL AREA AND EXTENT	18
7.0 SOURCE CONTROL MEASURE ALTERNATIVES DEVELOPMENT	18
7.1 Technology Screening.....	18
7.2 Development of Source Control Alternatives	19
8.0 DETAILED ANALYSIS OF SOURCE CONTROL ALTERNATIVES	20
8.1 Alternative 1 – No Action	20

8.2 Alternative 2 – Cap	21
8.3 Alternative 3 – Focused Removal and Cap	24
8.4 Alternative 4 – Removal	28
9.0 COMPARATIVE EVALUATION OF SOURCE CONTROL ALTERNATIVES.....	32
9.1 Protectiveness	32
9.2 Effectiveness	32
9.3 Long Term Reliability.....	32
9.4 Implementability.....	32
9.5 Implementation Risk	33
9.6 Reasonableness of Cost	33
9.7 Compatibility with In-Water Cleanup.....	33
9.8 Treatment or Removal of Hot Spots	33
10.0 RECOMMENDATION	33
10.1 Recommended Source Control Alternative	33
10.2 Permit Requirements and Periodic Reviews	34
10.3 Residual Risk Assessment	34
11.0 REFERENCES	35

Tables

- 1 Initial Screening and Evaluation of Technologies
- 2a Cost Estimate – Cap Option 1 (1.5H:1V)
- 2b Cost Estimate – Cap Option 2 (3H:1V)
- 3a Cost Estimate – Focused Removal and Cap Option 1 (1.5H:1V)
- 3b Cost Estimate – Focused Removal and Cap Option 2 (3H:1V)
- 4a Cost Estimate – Removal Option 1 (1.5H:1V)
- 4b Cost Estimate – Removal Option 2 (3H:1V)
- 5 Comparative Evaluation of Alternatives

Figures

- 1 Site Location Map
- 2 Site Vicinity Plan
- 3 Sample Location Map
- 4 Locality of the Facility
- 5 Remedial Action Plan – Cap
- 6 Representative Cross Sections – Cap Alternative
- 7 Typical Cap Section
- 8 Remedial Action Plan – Focused Removal and Cap
- 9 Remedial Action Plan – Removal
- 10 Representative Cross Sections – Removal Alternative

Appendices

- A Data Tables and COPC Screening
- B Screening Level Values
- C Screening Tables
- D Screening Summary Figures
- E Preliminary Waste Designation Evaluation
- F ARARs: Table 3.4-1 from Draft Portland Harbor Feasibility Study
- G Quantity Calculations

1.0 Introduction

This report presents the feasibility study (FS) for source control at the Schnitzer ASD Yard riverbank at Gunderson LLC's Front Avenue facility.

1.1 Purpose

Gunderson LLC (Gunderson) owns and operates a railcar and barge manufacturing facility at 4350 NW Front Avenue, Portland, Oregon (the Facility). The Schnitzer ASD Yard is generally the upstream one third of the Facility and is also referred to in some Oregon Department of Environmental Quality (DEQ) documents as "Area 3."

The source control evaluation (SCE) for the Schnitzer ASD Yard (Ash Creek, 2012) concluded that the presence of chemicals of concern in riverbank soil and the potential for a complete release pathway for the riverbank soil warranted completion of an FS for a riverbank source control action.

1.2 Regulatory Framework

A portion of the Willamette River within the City of Portland, the Portland Harbor, was added to the Superfund National Priority List in December 2000. The approximate boundaries of the Portland Harbor Study Area are from river mile (RM) 1.9 to RM 11.8. The Portland Harbor cleanup will address primarily sediment and soil contamination up to the mean low water mark of 13 feet NAVD88 but will also address uncontrolled sources of contamination to the sediments that are above that level. The U.S. Environmental Protection Agency (EPA) is the lead agency for the in-water study and cleanup, and the DEQ is the lead agency for upland studies and cleanup. The Facility is identified as DEQ Environmental Cleanup Site Information (ECSI) number 1155. This work is being completed under Voluntary Cleanup Agreement No. WMCVC-NWR-94-01 and the recently executed source control consent order between Gunderson and the DEQ. This FS was prepared in accordance with the requirements set out in the DEQ-EPA Portland Harbor Joint Source Control Strategy (JSCS; DEQ/EPA, 2005), CERCLA Engineering Evaluation/Cost Analysis process (EPA, 1993), and DEQ guidance for feasibility studies (DEQ, 2006).

1.3 Report Organization

The following is a brief overview of the organization of the report.

Site Background. Section 2 describes the Facility setting; a description of soil, groundwater, and surface water conditions; and a summary of previous environmental investigations.

Constituents of Concern. Section 3 is a description of the nature and extent constituents of concern found at the Facility.

Site Model. Section 4 summarizes the basic model for the site including the extent of areas to be addressed, existing conditions at the Facility, current site use, adjacent Portland Harbor activities, and waste considerations for soil removed from the site.

Source Control Objectives and Evaluation Criteria. The objectives of the source control actions and the extent of the areas affected are defined in Sections 5 and 6. The criteria used to evaluate source control measure alternatives are also defined.

Source Control Measures Alternatives Development. In Section 7, a list of general response actions are developed and presented to address the conditions encountered in the source control area. These general response actions form the basis for generating and screening technologies. Potential source control technologies were developed for each general response action identified. Technologies were then evaluated with respect to specific Facility conditions, media characteristics, and the ability to achieve the source control objectives. The technologies remaining after the screening process were combined to create potential alternatives for further detailed analysis.

Detailed Analysis of Source Control Alternatives. The potentially feasible source control alternatives are more fully developed in Section 8. The protective alternatives are evaluated based on the balancing factors from DEQ guidance – protectiveness, effectiveness, long-term feasibility, implementability, implementation risks, reasonableness of cost, and treatment of hot spots – and EPA criteria for non-time-critical removal actions. The evaluation includes sufficient detail to identify comparative or relative differences among alternatives.

Comparative Evaluation of Source Control Alternatives and Recommendation. After completion of the detailed analysis, the feasible source control alternatives are ranked based on the balancing factors and compared to generate an overall ranking. The results of the comparison rankings are discussed in Section 9. Based on these results, a source control measure is recommended and described in Section 10.

2.0 Background

2.1 Site Description

The Facility covers approximately 63 acres and 4,000 lineal feet of river frontage along the west bank of the Willamette River between RM 8.5 and 9.2 (Figure 1). The Facility is bordered by Lakeside Industries on the northwest, NW Front Avenue and the Burlington Northern Santa Fe (BNSF) Railroad Rail Yard on the southwest, Georgia-Pacific Corporation on the southeast, and the Willamette River on the northeast (Figure 2).

As shown on Figure 2, the Facility is divided into three areas defined as follows (from downriver to upriver): Area 1, Area 2, and the Schnitzer ASD Yard (also referred to in some documents as Area 3). Areas 1 and 2 are primarily used for manufacturing. The Schnitzer ASD Yard is primarily used as a storage yard. The Schnitzer ASD Yard covers approximately 20 upland acres and includes approximately 1,340 lineal feet of Willamette River frontage. The top of bank is approximately elevation 31 feet (all elevations NAVD88 unless otherwise indicated). The ordinary high water mark is 16.6 feet NGVD (U.S. Army Corps of Engineers, 2004) at RM 9, corresponding to 20.2 feet NAVD88. The in-water portion of the Portland Harbor Site is defined as below or equal to 13 feet NAVD88 (Integral, et al., 2012). An outfitting dock runs along almost the entire length of the riverbank of the Schnitzer ASD Yard (1,300 feet out of a total of 1,340 feet).

2.2 Historical Site Use

Site filling at the Facility generally occurred downstream to upstream from the 1940s to the 1970s. Based on a review of aerial photographs, by 1962 grade level within the Schnitzer ASD Yard had been raised and appeared to generally match the current configuration with a few exceptions related primarily to the riverbank. One exception is a notch in the riverbank, which is described in historical reports as the "former access gulley," that was filled after 1962. In addition, the "top of rip rap" line (1970 City map) suggests some filling occurred near the riverbank between 1962 and 1970, and the site was regraded in 1980 to raise the riverbank and to gently slope the uplands away from the riverbank (see Shaw [2011] for more detailed discussion).

The Schnitzer ASD Yard was used by multiple Schnitzer-related entities, including both Schnitzer Steel and American Ship Dismantlers (ASD), for ship dismantling operations as early as 1958. Aerial photographs show numerous stockpiles of ship dismantling debris throughout this portion of the Facility. Automobile crushing and shredding also occurred at the Schnitzer ASD Yard from the 1960s through 1979, resulting in extensive debris and waste piles. This area was cleared of visible debris by Schnitzer in 1979 and 1980, and debris is not visible on post-1985 aerial photographs (Shaw, 2011).

FMC Corporation (FMC) acquired the Schnitzer ASD Yard from Schnitzer in 1980. From 1980 to 1985, FMC used the site as a storage area for steel and finished railcars. The dock was used for outfitting barges and barge conversions, as well as finished railcar storage. FMC also leased moorage at the dock to third parties (FMC, 1982).

Gunderson LLC began operating the entire Facility in 1985.

2.3 Soil Conditions

Surface conditions consist primarily of pavement and compacted gravel. The majority of the Schnitzer ASD Yard is underlain by fill materials. This fill material was placed in lowland areas along the Willamette River to raise the land surface. Historical records indicate that the fill is predominantly dredged river sediment.

The fill includes fine sand and silty sand with some gravel and larger-size rock. Various manmade materials such as concrete, brick, metal, grit, and wood can be found in the fill. Fill depth ranges from 0.5 feet thick near Front Avenue to 25 feet thick near the river. Underlying the fill is recent alluvium deposits consisting of unconsolidated clay, silt, silty sand, and lenses and layers of fine-to-medium sand and gravel.

2.4 Groundwater Conditions

Depth to groundwater in the Schnitzer ASD Yard varies seasonally with high water generally being seen in February to March and low water in September to October. During groundwater monitoring conducted since 1991, depth to groundwater ranged from 5.7 feet to 30 feet below the ground surface (bgs) in groundwater monitoring wells located in the Schnitzer ASD Yard (with deeper depths generally closer to the river). The groundwater gradient beneath the Facility is towards the Willamette River.

2.5 Surface Water Conditions

There are no surface water features on the Facility. Precipitation either infiltrates through gravel on unpaved portions of the Schnitzer ASD Yard or is collected in storm drains and enters the Willamette River through one of five outfalls.

The Willamette River is the only surface water body near the Facility. In Portland, the river flows at a rate ranging from 8,300 cubic feet per second (cfs) in summer to 73,000 cfs in winter.

2.6 Upland Investigations

Environmental investigations have been conducted at the Schnitzer ASD Yard dating back to at least 1989. Soil borings and exploratory test pits have been completed, 13 groundwater monitoring wells have been installed, and soil and groundwater samples have been collected and analyzed. Results of these studies are presented in Shaw (2011) and Squire/Kleinfelder (2005). Figure 3 shows the locations of historical sampling on the Schnitzer ASD Yard completed within 100 feet of the top of bank. Data relevant to this FS (soil data collected within 100 feet of the top of bank) are summarized in Appendix A.

2.7 Summary of Source Control Evaluation

The *Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation* (SCE) was submitted to DEQ on August 30, 2012 (Ash Creek, 2012). The SCE supplements the *Area 3 – Erodible and Riverbank Soil Source Control Evaluation* (Shaw, 2011) and the *Evaluation of Potential for Erosion of Riverbank Soils and Proposed Interim Measures at the Schnitzer ASD Yard* (Flowing Solutions and Gunderson, 2012) that were submitted to the DEQ in May 2011 and May 2012, respectively. The objectives of the SCE were to: (1) identify potential sources of contamination; (2) evaluate the potential sources identified; and (3) if

necessary, recommend controls of potential sources of contamination that may adversely impact the Willamette River.

The SCE assessed the four conditions that must occur for a source control action to be necessary. The conclusion of the assessment for each of these conditions is summarized below.

Chemicals Are Present in Soil. As discussed in greater detail in Section 3, chemicals are present in riverbank soil.

Chemical Concentrations Exceed Screening Levels. Data were screened against JSCS screening levels. Four primary constituents of potential concern (COPCs) for potential bank erosion were identified (polychlorinated biphenyls [PCBs], lead, nickel, and zinc). At the request of DEQ, additional screening of soil data is completed in Section 3 of this FS.

Areas of the Bank Exceed the Average Gradient and Could Fail if Left Unprotected. The riverbank erosion evaluation concluded that the overall riverbank has been stable since before 1985, a period of 27 years, based on the aerial photography review. Some areas of the riverbank are locally steeper than the average riverbank gradient and have the potential for local instability.

Erosion Rate is Sufficiently Elevated. There are several lines of evidence suggesting that the rate of soil erosion is not sufficient to cause unacceptable impacts to sediments. Bank reconnaissance combined with prior observations over the past three years and aerial photograph analysis did not identify any active or recent instabilities, suggesting that failures are infrequent. No specific indication of any large scale bank failure is evident since before 1985. Contamination in the sediment and similar contamination in the riverbank is consistent with historical mass wasting or site alterations (e.g., during operations or site cleanup prior to FMC occupation) being a complete release pathway from upland to sediments. However, determining acceptable erosion rates is problematic because the erosion process following the 1980 site alterations is slow, and changes in contaminant concentrations during transport are uncertain. For the purpose of the FS, it was presumed that there is a potentially complete pathway from the riverbank to sediment.

Conclusion. Based on the presence of various constituents in riverbank soil and the potential for releases of riverbank soil, an FS for source control measures was required by DEQ. The requirement was based on the assumption that the combination of soil concentrations and potential erosion rate are sufficient to potentially cause unacceptable risk of contamination to river sediments.

3.0 Nature and Extent of Constituents of Concern

Although the SCE focused on four primary constituents of concern (COCs), other constituents are present above screening level values (SLVs). In its letter commenting on the FS work plan, DEQ requested that a comprehensive screening of the data be included in the FS (DEQ, 2014) to identify COCs. The screening process consisted of the following steps.

- Compile SLVs and hot spot levels (as defined in ORS 465.315);
- Compile applicable soil data;
- Screen data against lowest relevant SLVs to identify COPCs;
- Screen COPCs against relevant SLVs for applicable pathways and receptors to identify COCs;
- Screen COPCs against hot spot levels to identify hot spots; and
- Identify the locations of COCs above SLVs and hot spots.

3.1 Compile SLVs and Hot Spot Levels

As requested in the DEQ comments, data were screened against an expanded screening level list. This section summarizes the exposure scenarios and receptors evaluated and presents the corresponding SLVs and high-concentration hot spot levels.

3.1.1 Sediments – Human Health

For this scenario, riverbank soil could be transported to river sediments where human receptors are directly or indirectly exposed to the sediments. For screening purposes, it was assumed that the soil would be transported without a change in concentration of COCs. This assumption is likely conservative¹ and adds considerable uncertainty to the evaluation. The following screening levels were used to assess human exposure to sediments.

- JSCS SLVs (only those based on human endpoints – PCBs, chlordane, DDT, hexachlorobenzene, pentachlorophenol, and dioxins/furans);
- DEQ sediment bioaccumulation SLVs for human receptors; and
- EPA Portland Harbor draft sediment preliminary remediation goals (PRGs)² for remedial action objective (RAO) 1 (direct contact with sediment) and RAO 2 (biota ingestion).

¹ COCs are generally associated with the finer soil fractions that are more likely to be widely dispersed during transport processes, reducing the overall concentration of COCs after transport to sediments.

² Draft final PRGs issued April 11, 2014.

JSCS SLVs were selected by DEQ and EPA using a range of established human and ecological screening criteria. The SLVs do not account for background conditions (anthropogenic or naturally occurring) in the Portland Harbor Superfund Site; therefore, in some cases JSCS SLVs do not represent standards that are realistically attainable. For example, the JSCS SLV for total PCBs in sediment is 0.39 µg/kg, while the background concentrations currently under consideration by EPA range between 6 and 17 µg/kg.

In accordance with OAR 340-122-0115(32)(b)(B), hot spots may be present in bank soil if that bank soil is reasonably likely to migrate to sediment to such an extent that it causes a high-concentration hot spot in sediment.³ Given the assumption in the paragraph above, to identify potential hot spots in bank soil, bank soil data were screened against SLVs for sediment. Preliminary hot spot levels were determined using a 10-times (non-carcinogen) or 100-times (carcinogen) multiplier on the above SLVs.⁴

Table B-1 in Appendix B lists the SLVs and hot spot levels for protection of human health associated with sediment exposure pathways.

3.1.2 Sediments – Ecological

Using the same transport assumption for ecological receptors as used above for human receptors, the following screening levels were used to assess ecological exposure to sediments.

- JSCS SLVs (only those based on ecological endpoints – excludes PCBs, chlordane, DDT, hexachlorobenzene, pentachlorophenol, and dioxins/furans);
- DEQ sediment bioaccumulation – SLVs for ecological receptors; and
- EPA Portland Harbor draft sediment PRGs for RAO 5 (direct contact with sediment) and RAO 6 (biota ingestion).

³ It should be noted that the Oregon hot spot rule is not currently being considered an ARAR for the Portland Harbor Superfund Site. As requested by DEQ, the hot spot levels in Appendices B through D include hot spots related to migration to river sediments. However, because hot spots are not currently being considered an ARAR for river sediments, the evaluation of alternatives considers only hot spots related to direct contact with soil. Furthermore, as indicated in the DEQ Staff Report for the Source Control Measure at the Evraz Oregon Steel Mills Riverbank, hot spots based on bioaccumulation are more difficult to define based on the nature of exposure (i.e., it occurs over a broad area) and the difficulty of determining how riverbank concentrations would disperse in the river via erosion.

⁴ The multiplier is applied to risk-based SLVs only. When the screening level is based on natural background, the hot spot level was determined from the lowest risk-based screening level that resulted in a hot spot level above natural background. If no risk-based screening level was available, no hot spot level was calculated. Overall, this approach for determining hot spots was required by DEQ. There are several factors that make this approach overly conservative such as: (1) hot spots are to be based on an acceptable risk level, but the values being used are screening levels that likely overestimate risk; and (2) the assumption that concentrations in soil represent potential concentrations in sediment is likely conservative. Throughout this FS, whenever the term “hot spot” is used, these uncertainties in hot spot levels should be considered.

Again as for human receptors, hot spots in riverbank soil were assessed by screening bank soil data against high-concentration hot spots that were calculated based on sediment screening levels. Preliminary hot spot levels were determined using a 10-times multiplier on the above SLVs (and accounting for background levels in the same manner as above).

Table B-2 in Appendix B lists the SLVs and hot spot levels for protection of ecological receptors associated with sediment exposure pathways.

3.1.3 Upland Soil – Human Health

This scenario considers direct contact between human receptors and riverbank soil under baseline conditions that consider hypothetical future uses by various receptors (actual current conditions are intermittent occupational exposures). DEQ Risk-Based Concentrations (RBCs) for occupational, construction, and excavation workers were used to assess human exposure to soil under baseline conditions. Preliminary hot spot levels were determined using a 10-times (non-carcinogen) or 100-times (carcinogen) multiplier on the RBCs (and accounting for background levels in the same manner as above).

Table B-3 in Appendix B lists the soil RBCs and hot spot levels for protection of human health direct contact with soil.

3.1.4 Terrestrial – Ecological

This scenario considers direct contact between terrestrial ecological receptors and riverbank soil. DEQ ecological risk assessment SLVs for plants, invertebrates, birds, and mammals were used to assess terrestrial ecological exposure to soil. Preliminary hot spot levels were determined using a 10-times multiplier on the SLVs (and accounting for background levels in the same manner as above).

Table B-4 in Appendix B lists the soil SLVs and hot spot levels for protection of terrestrial ecological receptors for direct contact with soil.

3.2 Compile Soil Data

The primary purpose of this FS is to evaluate source control actions to address the potential for upland soil to migrate to the river. Therefore, the soil data included in the evaluation were for samples collected near the riverbank, defined as within 100 feet of the top of bank based on the following analysis. The upland area is part of an active industrial facility where land is a valuable resource. Consequently, the riverbank will be maintained to prevent significant loss of land area. For similar reasons, any final remedy for the riverbank will maintain the steepest safe slope (thereby maximizing usable land area). Based on experience and professional judgment, engineered slopes in active industrial areas of the Portland Harbor are generally

in the range of 1.5 horizontal:1 vertical (1.5H:1V) to 3H:1V. The existing slope is approximately 30 feet high with a slope of approximately 1H:1V. It follows that a final engineered slope would extend not farther than approximately 60 feet back from the top of bank. To accommodate some uncertainty, a distance of 100 feet from top of bank was used to define the area of interest for riverbank soil data.⁵

Tables A-1 through A-18 in Appendix A list the soil data for samples collected within 100 feet of the top of bank.

3.3 Identify COPCs

For each constituent of interest (COI), the lowest SLV from each of Tables B-1 through B-4 was retained as the primary screening level for identification of COPCs. In Tables A-1 through A-18, the riverbank soil data are screened against the primary SLVs. Each COI detected at least once above an SLV was retained as a COPC for the Schnitzer ASD Yard riverbank. The COPCs thus identified include the following:

- Metals – Each metal analyzed was detected at least once above primary screening levels, except for beryllium and thallium.
- PCBs – Aroclor 1254, Aroclor 1260, and total PCBs.
- Polycyclic aromatic hydrocarbons (PAHs) – Each PAH analyzed was detected at least once above primary screening levels.
- Semi-volatile organic compounds (SVOCs) – Dibenzofuran.
- Phthalates – Bis(2-ethylhexyl)phthalate (BEHP).
- Organotins – Tributyltin (TBT).
- Dioxins/Furans – Each dioxin/furan congener analyzed, except octachlorodibenzofuran (OCDF), was detected at least once above primary screening levels.

3.4 Identify COCs

In Appendix C, COPC data are screened against SLVs corresponding to the relevant exposure pathways and receptors: sediment human health (Tables C-1 through C-17), sediment ecological (Tables C-18 through C-34), upland human health (Tables C-35 through C-51), and terrestrial ecological (Tables C-52 through C-68). Based on the screening in Appendix C, the following COCs were identified for riverbank soil.

⁵ Note that this analysis was conducted for the purpose of establishing potentially representative soil data. Stabilization of banks could be achieved by filling in front of the bank, cutting the bank to a flatter slope, or a combination of these techniques. Furthermore, the acceptable steepness of the final slope depends on several factors such as soil type and surface finish. These factors would ultimately be determined during final design of a selected action.

COC Screening Summary

COC Group	Human Health		Ecological	
	Upland	In-Water	Terrestrial	In-Water
Metals	As, Pb, Cu	As, Pb, Hg, Se	All	All except Ba
PCBs	Total PCBs	Total PCBs	1254, Total PCBs	1254, 1260, Total PCBs
PAHs	5 PAHs, primarily benzo(a)pyrene	Pyrene, BaP Eq	8 PAHs and HPAHs	Most PAHs
SVOCs	--	--	Dibenzofuran	--
Phthalates	--	--	BEHP	--
Organotins	--	TBT	--	TBT
Dioxins/Furans	2,3,7,8-TCDD, TEQ	Most Congeners	2,3,4,7,8-PeCDF, TEQ	Most Congeners

3.5 Identify COCs Present Above Hot Spot Levels

In Tables C-1 through C-68, the riverbank soil data are screened against the hot spot levels for the various receptors and pathways. The COCs present in at least one location above a hot spot level are summarized as follows.

Hot Spot Screening Summary

COC Group	Human Health		Ecological	
	Upland	In-Water	Terrestrial	In-Water
Metals	--	--	As, Cu, Hg, Ni, Pb, Se, Zn	Cr, Cu, Ni, Pb, Zn
PCBs	--	Total PCBs	1254, Total PCBs	1254, 1260, Total PCBs
PAHs	--	--	--	12 PAHs
SVOCs	--	--	Dibenzofuran	--
Phthalates	--	--	--	--
Organotins	--	--	--	TBT
Dioxins/Furans	--	12 Congeners	2,3,4,7,8-PeCDF	10 Congeners

3.6 Lateral Extent of Soil with COCs above SLVs and Hot Spot Levels

Figures D-1 through D-17 in Appendix D show the location of soil samples with COC concentrations exceeding SLVs and hot spot levels. The following discussion summarizes the lateral extent of COCs as shown on the figures.

Human Health, Sediment Exposure. Under the exposure scenario where bank soil is eroded into river sediments with unchanged concentrations, metals, PCBs, PAHs, TBT, and dioxins/furans were identified as COCs for human health. TBT was detected above the screening level in only 6 of 62 samples, and the maximum exceedance was only 3.4 times the SLV, so no figures were generated for TBT. Figures D-1 through D-4 show the lateral extent of metals, PCBs, PAHs, and dioxins/furans, respectively. The extent of these key COCs is summarized as follows.

- COCs Above Screening Levels – Metals, PCBs, PAHs, and dioxins/furans were detected above screening levels in almost every location analyzed.
- COCs Above Hot Spot Levels – Metals and PAHs were not detected above hot spot levels. PCBs and dioxins/furans were detected above hot spot levels in almost every location analyzed.

Ecological, Sediment Exposure. Under the exposure scenario where bank soil is eroded into river sediments with unchanged concentrations, metals, PCBs, PAHs, TBT, and dioxins/furans were identified as COCs for ecological receptors. Figures D-5 through D-9 show the lateral extent of COCs, respectively. The extent of these key COCs is summarized as follows.

- COCs Above Screening Levels – Metals and dioxins/furans were detected above screening levels in each location analyzed. PCBs were detected above screening levels in 32 out of 38 locations analyzed. PAHs and TBT were detected above screening levels in nine and eleven locations, respectively, with over half of the locations located upriver of the Gantry.
- COCs Above Hot Spot Levels – Dioxins/furans were detected above hot spot levels in each of the six locations sampled. PCBs were detected above hot spot levels in 27 of 38 locations, with most of the locations above hot spot levels located on the river bank. TBT, PAHs, and metals were detected above hot spot levels in 10 to 50 percent of the locations analyzed, with most of the locations upriver of the Gantry.

Human Health, Direct Contact. For direct contact with bank soil, metals, PCBs, PAHs, and dioxins/furans were identified as COCs for human health. Figures D-10 through D-13 show the lateral extent of these COCs, respectively. The extent of these key COCs is summarized as follows.

- COCs Above Screening Levels – COCs were detected above screening levels in approximately 65 to 75 percent of locations analyzed.
- COCs Above Hot Spot Levels – COCs were not detected above hot spot levels.

Terrestrial Ecological, Direct Contact. For direct contact with bank soil, metals, PCBs, PAHs, dibenzofuran, BEHP, and dioxins/furans were identified as COCs for terrestrial receptors. Dibenzofuran was detected above the screening level (and hot spot level) at one location – HA-43, upriver of the Gantry. BEHP was detected above the screening level in 2 of 38 locations with a maximum exceedance of 1.4 times the screening level (both locations are upriver of the Gantry). Figures D-14 through D-17 show the lateral

extent of metals, PCBs, PAHs, and dioxins/furans, respectively. For terrestrial ecological receptors, it was assumed that unacceptable risk and hot spots could be present only in areas with potentially viable habitat. These areas are limited to the riverbank that is not beneath structures. The extent of these key COCs is summarized as follows.

- COCs Above Screening Levels – Metals were detected above screening levels at each location analyzed. PCBs were detected above screening levels in 18 of 20 locations (the two locations below screening levels were located upriver of the southern bridge to the outfitting dock). Relatively more metals were detected above screening levels in samples from upriver of the Gantry (seven to eleven metals exceeding upriver versus three to eight metals downriver). PAHs were detected above screening levels in 7 of 20 locations, with most locations above screening levels upriver of the Gantry. Dioxins/furans were detected above cleanup levels in each location sampled.
- COCs Above Hot Spot Levels – Metals were detected above hot spot levels in most samples with relatively more metals detected above hot spot levels in samples from upriver of the Gantry (four to six metals exceeding upriver versus one to four metals downriver). PCBs were detected above hot spot levels in 12 of 20 locations, and all but one of the locations is upriver of the Gantry. PAHs were not detected above hot spot levels. Dioxins/furans were detected above hot spot levels in each location sampled.

3.7 Vertical Extent of Soil with COCs above SLVs

Soil samples were collected from 38 locations on and near the riverbank, distributed generally as follows.

- Surface soil on riverbank between elevation 13 feet and top of bank: 17 locations (S3-1 through S3-14, 3.7-COMP, 3.8-COMP, and 3.9-COMP);
- Hand auger borings to depths of 1.5 to 2.5 feet on beach below elevation 13 feet: 7 locations (HA-37 through HA-43);
- Soil borings landward of top of bank to depths of 2 to 5 feet: 9 locations (3.5, 3.7 through 3.9, GP-312 through GP-315, and HA-34); and
- Soil borings landward of top of bank to depths of 10 to 25 feet: 5 locations (3.2 through 3.4, 3.6, and 3.10).

Each soil sample analyzed contained at least one COC at a concentration above the preliminary screening level. The following paragraphs discuss the vertical extent of COCs for each of the primary receptors and exposure pathways.

Human and Ecological Health, Sediment Exposure. Within the vertical extent of soil sampled, at least one COC was detected above screening levels. Therefore, for the purpose of the FS, it was assumed that

migration of any soil from the riverbank, regardless of depth, could result in an unacceptable sediment concentration.

Human Health, Direct Contact. Potential receptors for human health direct contact include occupational, construction, and excavation workers. Occupational workers are assumed to contact surface soil (zero to three-foot depth range). The discussion in Section 3.6 presents the extent of potential contact with surface soil above RBCs. For construction and excavation workers, contact is assumed to be in the depth range up to 15 feet. Thirteen soil borings were advanced to depths greater than three feet (3.2 through 3.10, and GP-312 through GP-315). For direct contact with soil, only arsenic, lead, and benzo(a)pyrene were detected above construction or excavation worker SLVs within the depth range of 3 to 15 feet, summarized as follows.

- Boring 3.2 – Arsenic (10 feet), lead (15 feet), and benzo(a)pyrene (15 feet) were detected above the construction worker RBC, and lead was detected above the excavation worker RBC.
- Boring 3.8 – Arsenic (5 feet) and lead (5 feet) were detected above the construction worker RBC, and lead was detected above the excavation worker RBC.
- Boring 3.9 – Arsenic (5 feet) was detected above the construction worker RBC.
- Hot Spot Levels – The extent of hot spots in shallow soil (0 to 3 feet) are discussed in Section 3.6. COCs were not detected above construction worker or excavation worker hot spot levels in soil below a depth of 3 feet.

Terrestrial Ecological, Direct Contact. Terrestrial receptors are assumed to contact surface soil (0 to 3-foot depth range). The discussion in Section 3.6 presents the extent of potential contact of terrestrial receptors with surface soil above SLVs.

4.0 Site Model

4.1 Locality of Facility

The locality of the facility (LOF) is defined by the locus of points where a human or ecological receptor either contacts or is reasonably likely to come into contact with chemical constituents originating at the site. The LOF is based on the location, fate, and transport of chemical constituents. As discussed in Section 3.2, the area from which soil potentially could be transported to the river was conservatively defined as any point within 100 feet of the top of the river bank. Additionally, near-shore surface water/sediment adjacent to the site is the potential receiving area of potential release of soil from the riverbank, so that area defines the riverward boundary of the LOF. Figure 4 shows the approximate LOF.

4.2 Summary of Nature and Extent of Constituents of Concern

Primary COCs include metals, PCBs, PAHs, and dioxins/furans. Additional COCs include TBT (ecological exposure to sediments), dibenzofuran (one location for terrestrial ecological receptors), and BEHP (two locations for ecological terrestrial receptors). Overall, multiple COCs exceed screening levels at locations throughout the river bank, but higher relative concentrations are located upriver of the Gantry. For COCs and pathways where exceedances are limited, most exceedances occur upriver of the Gantry. For soil direct contact hot spots, metals exceed hot spot levels at most locations, and PCBs exceed hot spot levels primarily upriver of the Gantry.

4.3 Existing Conditions

The subject area of this FS is the riverbank along the Schnitzer ASD Yard, as shown on Figure 4. As discussed in Section 3.1 of the SCE, the site consists of the strip of land between elevation 13 feet NAVD88 and the line approximately 100 horizontal feet landward of the top of the riverbank. This upland area represents the area with the potential for release into the river and/or the area that may be included within the footprint of an engineered slope. The majority of the riverbank at the site is characterized by an approximately 1H:1V slope, although some riverbank areas are steeper. An outfitting dock runs along almost the entire length of the riverbank of the Schnitzer ASD Yard (1,300 feet out of a total of 1,340 feet). During periods of low water, a sand/sediment beach is present in front of the riverbank, behind the Outfitting Dock.

The exposed riverbank surface is generally composed of concrete, rock rip rap, metal, wood, and brick, and the riverbank core is composed of dredge fill and possible other materials. The toe area of most of the riverbank in the Schnitzer ASD Yard is covered with a heterogeneous mixture of rock rip rap, grouted rip rap, concrete (Portland cement and asphalt) debris, grouted debris, bricks, and large pieces of steel. The upper portions of the bank, (generally above approximately elevation 20 NAVD88), are largely unarmored and some locations are steeper than the average riverbank slope of 1H:1V. The majority of the steeper riverbank areas are covered with anchored coir fabric and planted with native vegetation.

4.4 Site Use

Since purchasing the Facility in 1985, Gunderson has used the Schnitzer ASD Yard only for material storage; staging finished railcars for delivery; mooring and berthing finished barges; completing final outfitting work on barges (minor welding, grinding, painting and/or blasting); completing minor outfitting work on finished railcars; and office use (Gunderson constructed the new Marine Engineering Building in 2005). Land area is a valuable resource supporting the ongoing manufacturing activities at Areas 1 and 2.

4.5 General Riverbank Stability for FS Analysis

One of the primary mechanisms to be addressed by the source control action is migration of riverbank soil into river sediments via slope failure. This section presents a semi-quantitative evaluation of the bank stability to provide a conservative slope configuration for the purpose of the FS evaluation. More detailed studies during design – factoring in site-specific soil properties, actual construction materials, and site use constraints – would be completed to design the final riverbank slopes.

The riverbank was constructed primarily from dredge sand fills. These typically consist of sand to silty sand. Assuming a conservative friction angle of 27 degrees for silty sand and a generally accepted safety factor of 1.5, the resulting riverbank slope would be 3H:1V. Alternatively, using sand/gravel fill with an armored slope could result in an acceptable slope of 1.5H:1V. A range of slopes from 1.5H:1V to 3H:1V is used in the FS evaluations. Again, during design, actual site conditions and proposed construction materials will be used in the analysis to set final finished slopes.

4.6 Portland Harbor Activities

The draft Portland Harbor feasibility study was reviewed to identify the currently proposed in-water remedy for the area immediately adjacent to the site. Proposed in-water remedies are summarized on Figures 7.2-1 through 7.2-10 of the draft Portland Harbor feasibility study. Active cleanup of sediments is proposed for this area in all of the alternatives except No Action. For removal-focused alternatives, the draft feasibility study proposes an engineered cap beneath and landward of the dock structures and dredging elsewhere. For the integrated-focused alternatives, the proposed remedy is in situ treatment everywhere adjacent to the shoreline. In situ treatment would consist of broadcasting activated carbon onto the sediment surface.

4.7 Waste Considerations

Many potential source control actions will include excavation and disposal of soil wastes. This section presents a preliminary waste designation evaluation of potential soil wastes for the purpose of scoping and costing source control alternatives. A specific waste designation evaluation will be conducted for the actual remedy implemented at that time.

Listed Waste Considerations. Documented historical site uses include ship breaking, automobile shredding, and material storage. These uses do not typically include non-specific source wastes (F-list), processes (K-list), or commercial chemical products (P-list and U-list) corresponding to listed hazardous wastes. Therefore, excavated soil is not expected to be or contain a listed hazardous waste.

Characteristic Waste Considerations. Excavated soil generally does not exhibit characteristics of ignitability, corrosivity, or reactivity, but may exhibit toxicity characteristics. Of the chemicals on the toxicity characteristic list, metals are a primary COC at the site. Selected soil samples have been tested for metals

using the Toxicity Characteristic Leaching Procedure (TCLP). These results are presented and evaluated in Appendix E. Table E-1 summarizes results for total metals and TCLP metals for those metals on the characteristic waste list. Based on the total metals results, the samples analyzed for TCLP metals are representative of the overall soils sampled. Comparing the maximum TCLP values to the corresponding waste limits, only lead was detected at concentrations above the characteristic waste limits. Sixteen samples were analyzed for TCLP Lead. The lead results are summarized in Table E-2. From these results, 83 percent of samples with total lead greater than 1,000 milligrams per kilogram (mg/kg) exceeded the hazardous waste limit, and 89 percent of the samples with less than 1,000 mg/kg total lead were less than the hazardous waste limit. Figure E-1 shows the location of soil samples with total lead greater than 1,000 mg/kg. Except for one surface soil sample, samples with total lead greater than 1,000 mg/kg (and therefore potentially exhibiting characteristics of hazardous waste) are located beneath the Gantry or between the Gantry and the upstream rail line to the Outfitting Dock.

Land Disposal Restrictions. Soil containing hazardous waste is subject to certain restrictions on disposal in a landfill if the soil also contains chemicals on the land disposal restriction list (e.g., dioxins). If soil targeted for disposal is a characteristic waste as a result of the presence of leachable lead, further evaluation for potential land disposal restrictions would be required, and treatment of the soil could be required prior to disposal. Alternatively, the soil could be treated prior to removal from the site to eliminate the characteristic making it a hazardous waste (e.g., stabilize the soil to reduce the leachability of the lead).

PCB Waste. In accordance with regulations governing the disposal of PCB remediation waste, soil containing less than 50 mg/kg total PCBs may be disposed of in a licensed solid waste landfill. The maximum detected concentration of PCBs in samples from the LOF is 31 mg/kg.

5.0 Source Control Objectives and Evaluation Criteria

5.1 Source Control Objectives

The source control objectives were developed to address soil concentrations above SLVs and hot spot levels for the relevant pathways and receptors as discussed in Section 3. The following are the source control objectives.

- Prevent migration of riverbank soils resulting in sediment concentrations of COCs exceeding the following:
 - Human health SLVs in Table B-1; and
 - Ecological SLVs in Table B-2.

-
- Prevent direct contact by human or terrestrial receptors with riverbank soils with concentrations of COCs exceeding the following:
 - Human health RBCs in Table B-3; and
 - Ecological SLVs in Table B-4.
 - To the extent practicable as defined by DEQ rules, eliminate hot spots of contamination through treatment or excavation and offsite disposal. Hot spot levels are listed in Tables B-1 through B-4.

5.2 Evaluation Criteria

The JSCS guidance indicates that selection of a source control measure will be based on a feasibility study developed in general accordance with the CERCLA Engineering Evaluation/Cost Analysis (EE/CA) process, and that the site remedy will be selected in accordance with OAR 340-122-0010 through 340-122-0115. The evaluation of potentially feasible alternatives was based on the criteria in OAR 340-122-085(4), supplemented with criteria from EE/CA guidance, as summarized below.

5.2.1 Protectiveness

Protectiveness is a threshold requirement; only alternatives that meet the protectiveness requirements were evaluated (OAR 340-122-040). The protectiveness standards are:

- Ability of remedial action to protect present and future public health, safety, and welfare;
- Ability of remedial action to achieve acceptable risk levels specified in OAR 340-122-115;
- Ability of remedial action to prevent or minimize future releases and migration of hazardous substances in the environment; and
- Requirements for long-term monitoring, operation, maintenance, and review.

This is an overall assessment that considers evaluation under the balancing factors below as well as compliance with applicable or relevant and appropriate requirements (ARARs).

5.2.2 Balancing Factors

Balancing Factors include the following (OAR 340-122-090(3)):

- Effectiveness: Ability and timeframe of remedial action to achieve protection through eliminating or managing risk (EE/CA equivalent: long-term effectiveness);
- Long-Term Reliability: Reliability of remedial action to eliminate or manage risk and associated uncertainties (EE/CA equivalent: permanence);
- Implementability: Ease or difficulty of implementing a remedial action considering technical, practical, and regulatory requirements (EE/CA equivalent: implementability including consideration of ARARs);

-
- Implementation Risk: Potential impacts to workers, the community, and the environment during implementation (EE/CA equivalent: short-term effectiveness); and
 - Reasonableness of Costs: Considers capital costs, operations and maintenance, and periodic review, and includes a net present-value evaluation of the remedial action. Estimated costs are typically +50% to -30% of actual cost if the alternative were to be implemented (EE/CA equivalent: cost). Cost estimates were prepared in accordance with EPA guidance (EPA, 2000).

5.2.3 Treatment or Removal of Hot Spots

Hot spots were evaluated based on the feasibility of treatment/removal of the hot spot using the above balancing factors with a higher threshold for cost reasonableness (OAR 340-122-085(5, 6, 7), -090(4)). In accordance with DEQ rules, the higher threshold was applied only as long as the hot spot would exist during the cleanup process. Evaluation of hot spots addresses the EPA policy for preference for treatment. As discussed previously, because hot spots are not currently being considered an ARAR for river sediments, the evaluation of alternatives considers only hot spots related to direct contact with soil.

5.2.4 ARARs

It was assumed that relevant federal, state, and local laws and regulations would be the same as the ARARs developed for the draft Portland Harbor feasibility study. As discussed in Section 3.1, the Oregon hot spot rule is no longer being considered an ARAR for the Portland Harbor Superfund Site by EPA. Table 3.4-1 from the draft Portland Harbor feasibility study, listing the Portland Harbor ARARs, is reproduced in Appendix F.

6.0 Source Control Area and Extent

The extents of soil impacted by COPCs at concentrations that exceed screening levels and hot spot concentrations are shown on figures in Appendix D. Those figures show that approximately 1,300 lineal feet of riverbank is potentially the subject of source control measures. Specific areas and volumes of soil actually subject to source control will vary depending on the stabilization method under consideration (e.g., filling versus excavating to achieve long-term stable slopes). These specific areas and volumes are presented in the alternative descriptions in Section 8.

7.0 Source Control Measure Alternatives Development

7.1 Technology Screening

Table 1 provides a screening of the general response actions together with representative source control technologies for soil. Based on site use and type and extent of contaminants, these source control

technologies were screened to identify a list of technologies to include in a more detailed evaluation of potential source control alternatives. The results of the screening are shown in Table 1, with the shaded technologies eliminated from further consideration. Comments in the table explain the rationale for eliminating technologies from further consideration. Technologies remaining for further evaluation after the initial screening are listed below.

General Response Action	Technology
No Action	No Action
Institutional Controls	Deed Restriction Soil Management Plan Informational Signage
Engineering Controls	Shoreline Stabilization Monitoring Fencing
Containment	Cap
Removal	Excavation Off-Site Disposal
Ex Situ Treatment	Stabilization Separation

7.2 Development of Source Control Alternatives

The applicable primary, stand-alone cleanup technologies for soils include cap and excavation. These technologies are combined with the other various supporting technologies into source control alternatives. The source control alternatives for the river bank soil, therefore, include the following.

- No Action – This alternative is retained for comparison with the other source control alternatives listed below.
- Cap – This alternative includes capping of the impacted soils to prevent direct contact with, or migration of, impacted soil. Bank stabilization technologies (such as rip rap and bioengineered slopes) would protect the new slope and slopes beneath structures. To assure long-term effectiveness of the cap, this alternative includes engineering and institutional controls.
- Focused Removal and Cap – For this alternative, the relatively higher-concentration hot spots would be excavated for off-site disposal in a licensed landfill. The remainder of the impacted soils would be capped. Bank stabilization technologies (such as rip rap and bioengineered slopes) would protect the new slope and slopes beneath structures. Excavated soil would be disposed of in a licensed landfill. As necessary, potential hazardous wastes would be treated to non-hazardous conditions (e.g., through stabilization) prior to disposal in a Subtitle D landfill. Separation technologies could be used to separate rock and debris from contaminated soil,

reducing the amount of material disposed of in a landfill. To assure long-term effectiveness of the cap, this alternative includes engineering and institutional controls.

- Removal – This alternative includes the removal of impacted soils from the face of the river bank (except beneath structures). Bank stabilization technologies (such as rip rap and bioengineered slopes) would protect the new slope and slopes beneath structures. Excavated soil would be disposed of in a licensed landfill. As necessary, potential hazardous wastes would be treated to non-hazardous conditions (e.g., through stabilization) prior to disposal in a Subtitle D landfill. Separation technologies could be used to separate rock and debris from contaminated soil, reducing the amount of material disposed of in a landfill. To assure long-term effectiveness of the bank stabilization, this alternative includes engineering and institutional controls.

These alternatives are evaluated in detail in Section 8.

8.0 Detailed Analysis of Source Control Alternatives

This section describes and evaluates each of the source control alternatives identified in Section 7. Feasibility of the alternatives was evaluated using the criteria in Section 5.2. Following the evaluation, a comparative analysis of each alternative relative to every other alternative was completed (Section 9). The comparative analysis serves as the basis for selecting the recommended source control alternative (Section 10).

8.1 Alternative 1 – No Action

Description. According to OAR 340-122-085(2), a No Action alternative must be evaluated to provide a basis to evaluate more active alternatives. The No Action alternative assumes that no action is taken throughout the Facility. No monitoring is performed and no costs are incurred.

Protectiveness. This alternative would not be protective. No action would not prevent workers or ecological receptors from being exposed to soil and would not prevent potential future slope failure or erosion. This alternative has no action-specific ARARs; it does not comply with chemical specific ARARs.

Effectiveness. The No Action alternative is not effective at preventing human/ecological exposure to soil or preventing future slope failure/erosion into the river.

Long-Term Reliability. The No Action alternative has no engineering, control, or management technologies, and, therefore would not have long-term reliability.

Implementability. The No Action alternative is the easiest of the alternatives to implement.

Implementation Risk. Since there are no construction or remediation activities associated with the No Action alternative, there is no risk to workers or the public during implementation of this alternative.

Reasonableness of Cost. There is no cost associated with the No Action alternative.

Treatment of Hot Spots. The No Action alternative does not treat or remove hot spots.

8.2 Alternative 2 – Cap

Description. For this alternative, risk would be managed with an engineered cap to prevent direct contact by both human and ecological receptors and prevent migration of bank soils to the river. The cap alternative would include the following elements.

- The cap would be constructed from rock, fill, or topsoil imported from a source meeting Portland Harbor clean fill criteria. Some or all of any armor material (e.g., rip rap) could also serve as a portion of the cap. In planted areas, the minimum thickness would be 2 feet to reduce the potential transport of impacted soil to the ground surface by burrowing animals. A thinner cap could be used if the cap included a mechanism to prevent burrowing (e.g., a resistant grid). In armored areas, a thinner cap theoretically could be used, but requirements of rock size and filter material dictate a layer thickness on the order of 3 feet.
- Depending on a number of factors such as soil type, land use requirements, in-water remediation, permitting, and others, the finish slope will likely be in the range of 1.5H:1V to 3H:1V. Two scenarios are considered for the cap to evaluate this potential range of finish slope, described as follows.
 - Option 1 – 1.5H:1V: Except adjacent to structures, cap material would be used to construct fill at a slope of 1.5H:1V below the current top of slope. No substantive re-grading of the slope would be conducted. To maintain stability, the cap material below the top of slope would consist of rock armor and select fill.
 - Option 2 – 3H: 1V: Prior to placement of the cap and except adjacent to structures, the riverbank would be re-graded to a 3H:1V slope to achieve better long-term stability. The upper portion of the slope (above approximately elevation 20 feet) would be cut to the finish slope. Cut material would be used to construct a berm along the top of slope, under the cap. Imported fill would be placed in front of the lower slope to construct the lower portion of the 3H:1V slope.
 - For both options, beneath dock structures and adjacent to the Stevedore Building, the slope would not be re-graded; rather, long-term stability would be achieved through placement of buttress rock fill at a 1H:1V slope. Some areas beneath the Gantry contain asbestos debris and would require special construction techniques during initial placement of the rock buttress.

-
- Direct contact hot spots would not be addressed by treatment or removal.
 - The cap would be constructed with surface materials designed to resist erosive forces of river action. This would consist of armor material on the lower slope and native vegetation or armor on the upper slope.
 - A soil management plan would be prepared to describe proper soil handling in the event that the cap area must be disturbed in the future.
 - A deed restriction identifying the presence of the cap and contamination would be included.
 - Short-term risks during construction would be addressed through personal protective equipment and engineering controls (e.g., dust, erosion, sedimentation, and siltation controls).

Figure 5 shows the proposed cap area, and Figure 6 presents representative slope cross-sections showing the finished slope and coordination of the source control remedy with the in-water remedial action. Figure 7 presents typical cap sections with material types, layer thicknesses, and surface finish. These materials serve the dual function of preventing direct contact and preventing erosion of the bank.

This alternative would cover a total area of approximately 140,000 square feet. Construction material quantities are summarized below. Quantity calculations are presented in Appendix G (ranges represent Option 1 to Option 2, respectively).

- Site grading: 0 to 3,200 cubic yards (cy);
- Debris excavated: 0 to 320 cy;
- Common fill: 0 to 4,600 cy;
- Select fill: 4,700 to 3,800 cy;
- Rip rap: 6,100 to 6,700 cy;
- Topsoil: 1,300 to 4,300 cy;
- Demarcation fabric: 7,200 to 14,100 square yards;
- Jute mat: 2,000 to 6,500 square yards; and
- Landscaping: 0.4 to 1.3 acres.

The project would require imported fill of 12,000 to 19,000 cy. Of that total, approximately 9,100 to 12,000 net cy of fill would be within the 100-year floodplain. No material would be removed from the site except debris encountered during site grading that could not be incorporated into the finished berm at the top of slope.

Operation and maintenance would include irrigation (first growing season), cap inspection/repair, plant inspection and replacement, herbivore control, and invasive species control. A minimum of five years of active inspection and maintenance is expected. Long-term annual inspection would be required thereafter.

Protectiveness. The cap alternative is protective of human and ecological receptors by preventing direct contact with soil-containing COCs and by preventing transport of soil to the river. Long-term effectiveness is assured through routine inspection and maintenance, deed restriction, and implementation of a soil management plan.

Effectiveness. Capping is a very effective means to address risks associated with direct contact or dust. A soil cap is effective in this case because the COCs have relatively low solubility so are immobile. None of the COC mass would be removed from the site. The alternative is estimated to require less than six months to complete (not counting permitting time) and it would be protective immediately after implementation. This alternative would be designed to address ARARs listed in Appendix F, including actions related to discharges to the river, waste handling and transportation, impacts to fish and wildlife, flood impacts, PCB wastes, state cleanup laws, and air discharges. The action would be contained entirely within dock structures and the filled riverbank so navigation, historical, and archeological issues would not likely be relevant or applicable.

Long-Term Reliability. The long-term reliability of this alternative requires maintenance of the cap and enforcement of the institutional controls. In that event, caps have good long-term reliability. The reduction in the river bank slope greatly increases overall stability and therefore the long-term reliability of the alternative.

Implementability. This alternative uses standard construction services that are readily available. Access to the site is available from land through the Schnitzer ASD Yard. Access to beneath the dock structures is restricted for most construction equipment. Special construction requirements would be needed for capping of the asbestos contaminated soil. In-water permitting, including consultation with natural resource agencies, would be required. The project would result in approximately 9,000 to 12,000 cy of fill within the 100-year floodplain. The project would require on the order of 1,200 to 1,900 truck trips to the facility, assuming 20 cy per truck and two trips per load. As shown on Figure 6, this alternative is compatible with currently proposed in-water remedies. This alternative would reduce available usable land on the Schnitzer ASD Yard by approximately 0.4 to 1.2 acre.

Implementation Risk. Implementation risks include potential impacts to site workers, the community, and the environment during implementation, summarized as follows.

- Site Workers – Risks to construction workers include physical hazards from heavy construction equipment and work adjacent to surface water. Chemical hazards would be present related to inhalation of dust and direct contact with impacted soil. These risks are readily addressed with

-
- engineering controls (e.g., dust suppression) and personal protective gear (high visibility gear, personal flotation devices, gloves, etc.).
- Community – Impacts to the community are relatively limited because the site is located in an industrial area. There would be a short-term increase in truck traffic (resulting in risks from accidents, noise, pollution), but these activities would be similar to current industrial activities.
 - Environment – There would be short-term degradation of the habitat on and adjacent to the riverbank. The finished source control measure would match or enhance the existing conditions (armor on the lower bank and native species on the upper bank). Equipment and trucks used for the work would be diesel powered, contributing greenhouse gases to the atmosphere. Assuming the soil borrow source and landfill are located 10 and 30 miles from the site, respectively, the project would generate approximately 12,000 to 20,000 truck miles.

Reasonableness of Cost. Table 2 (2a and 2b for Options 1 and 2) provides a detailed cost estimate for this alternative. Costs include direct/indirect capital costs (e.g., design, permitting, construction), annual operation/maintenance costs, and costs of periodic reviews. Costs are stated in terms of net present value (NPV), assuming that capital costs are incurred in year zero (i.e., there is no discount of capital costs, only long-term costs). Costs for this alternative are summarized as follows with the ranges representing Options 1 and 2 for finished bank slope.

Capital	\$ 1,070,000 to 1,410,000
Long-Term (NPV)	\$ <u> </u> 330,000
Total	\$1,400,000 to 1,740,000

Treatment or Removal of Hot Spots. Hot spots related to direct contact by terrestrial ecological receptors would not be treated or removed.

8.3 Alternative 3 – Focused Removal and Cap

Description. For this alternative, soil with relatively higher concentrations of multiple chemicals would be excavated for off-site disposal. Remaining risk would be managed with an engineered cap to prevent direct contact by both human and ecological receptors and prevent migration of bank soils to the river. The focused removal and cap alternative would include the following elements.

- Soil at the upriver end of the bank (between the Gantry and the south rail access to the Outfitting Dock) would be excavated for off-site disposal in a Subtitle D landfill. The minimum excavation depth would be three feet, addressing hot spot soils related to upland direct contact exposure pathways.
- Excavated soil may be processed through a mechanical screen to remove large rock and debris. Rock would be reused as armor for the finished bank. Metallic debris would be recycled. Based

on the preliminary waste designation evaluation in Section 4.7, it is expected that without treatment, the excavated soil would be designated as hazardous waste based on leachability of lead. Prior to removal from the site, soil failing leachability criteria for characteristic hazardous waste would be stabilized to meet criteria for designation as solid waste.

- The cap would be constructed from rock, fill, or topsoil imported from a source meeting Portland Harbor clean fill criteria. Some or all of any armor material (e.g., rip rap) could also serve as a portion of the cap. In planted areas, the minimum thickness would be 2 feet to reduce the potential transport of impacted soil to the ground surface by burrowing animals. A thinner cap could be used if the cap included a mechanism to prevent burrowing (e.g., a resistant grid). In armored areas, a thinner cap theoretically could be used, but requirements of rock size and filter material dictate a layer thickness on the order of 3 feet.
- Depending on a number of factors such as soil type, land use requirements, in-water remediation, permitting, and others, the finish slope will likely be in the range of 1.5H:1V to 3H:1V. Two scenarios are considered for the cap to evaluate this potential range of finish slope, described as follows.
 - Option 1 – 1.5H:1V: Except adjacent to structures, cap material would be used to construct fill at a slope of 1.5H:1V below the current top of slope. No substantive re-grading of the slope would be conducted. To maintain stability, the cap material below the top of slope would consist of rock armor and select fill.
 - Option 2 – 3H: 1V: Prior to placement of the cap and except adjacent to structures, the riverbank would be re-graded to a 3H:1V slope to achieve better long-term stability. The upper portion of the slope (above approximately elevation 20 feet) would be cut to the finish slope. Cut material would be used to construct a berm along the top of slope, under the cap. Imported fill would be placed in front of the lower slope to construct the 3H:1V slope.
 - For both options, beneath dock structures and adjacent to the Stevedore Building, the slope would not be re-graded; rather, long-term stability would be achieved through placement of buttress rock fill at a 1H:1V slope. Soil beneath the Gantry contains asbestos and would require special construction techniques during initial placement of the rock buttress.
- The excavation at the upriver end of the bank would remove the relatively higher concentration direct-contact hot spot material. Direct-contact hot spot material beneath and down river from the Gantry would not be treated or removed.
- The cap would be constructed with surface materials designed to resist erosive forces of river action. This would consist of armor material on the lower slope and native vegetation on the upper slope.

-
- A soil management plan would be prepared to describe proper soil handling in the event that the cap area must be disturbed in the future and to address construction/excavation worker risks.
 - A deed restriction identifying the presence of the cap and contamination would be included.
 - Short-term risks during construction would be addressed through personal protective equipment and engineering controls (e.g., dust, erosion, sedimentation, and siltation controls).

Figure 8 shows the proposed focused excavation area and cap area, and Figure 6 presents representative slope cross-sections showing the finished slope and coordination of the source control remedy with the in-water remedial action. Figure 7 presents typical cap sections with material types, layer thicknesses, and surface finish. These materials serve the dual function of preventing direct contact and preventing erosion of the bank.

The alternative construction would cover a total area of approximately 140,000 square feet. Construction material quantities are summarized below. Quantity calculations are presented in Appendix G (ranges represent Option 1 to Option 2, respectively).

- Focused removal: 1,300 cy;
- Site grading: 0 to 2,400 cy;
- Debris excavated: 130 to 370 cy;
- Common fill: 0 to 4,800 cy;
- Select fill: 4,700 to 3,800 cy;
- Rip rap: 6,100 to 6,700 cy;
- Topsoil: 1,300 to 4,300 cy;
- Demarcation fabric: 7,200 to 14,100 square yards;
- Jute mat: 2,000 to 6,500 square yards; and
- Landscaping: 0.4 to 1.3 acres.

The project would require imported fill of 12,000 to 20,000 cy. Of that total, approximately 9,000 to 12,000 net cy of fill would be within the 100-year floodplain.

Operation and maintenance would include irrigation (first growing season), cap inspection/repair, plant inspection and replacement, herbivore control, and invasive species control. A minimum of five years of active inspection and maintenance is expected. Long-term annual inspection would be required thereafter.

Protectiveness. This alternative is protective of human and ecological receptors by removing a portion of the direct contact hot spots, preventing direct contact with remaining soil containing COCs, and by

preventing transport of soil to the river. Long-term effectiveness is assured through routine inspection and maintenance, deed restriction, and implementation of a soil management plan.

Effectiveness. Removal of the relatively higher concentration portion of the direct contact hot spots to a permitted landfill is very effective because the landfills have strict operational, closure, and monitoring requirements. Capping is a very effective means to address risks associated with direct contact or dust. A soil cap is effective in this case because the COCs have relatively low solubility so are immobile. A portion of the COC mass would be removed from the site. The alternative is estimated to require less than six months to complete (not counting permitting time) and it would be protective immediately after implementation. This alternative would be designed to address ARARs listed in Appendix F, including actions related to discharges to the river, waste handling and transportation, impacts to fish and wildlife, flood impacts, PCB wastes, state cleanup laws, and air discharges. The action would be contained entirely within dock structures and the filled riverbank so navigation, historical, and archeological issues would not likely be relevant or applicable.

Long-Term Reliability. The long-term reliability of this alternative requires maintenance of the cap and enforcement of the institutional controls. In that event, caps have good long-term reliability. Permitted landfills also require long-term maintenance but generally provide good long-term reliability. The reduction in the river bank slope greatly increases overall stability and therefore the long-term reliability of the alternative.

Implementability. This alternative uses standard construction services that are readily available. Access to the site is available from land through the Schnitzer ASD Yard. Access to beneath the dock structures is restricted for most construction equipment. Special construction requirements would be needed for capping of the asbestos soil. In-water permitting, including consultation with natural resource agencies, would be required. The project would result in approximately 9,000 to 12,000 cy of fill within the 100-year floodplain. The project would require on the order of 1,300 to 2,200 truck trips to the facility, assuming 20 cy per truck and two trips per load. As shown on Figure 6, this alternative is compatible with currently proposed in-water remedies. This alternative would reduce available usable land on the Schnitzer ASD Yard by approximately 0.4 to 1.2 acre.

Implementation Risk. Implementation risks include potential impacts to site workers, the community, and the environment during implementation, summarized as follows.

- Site Workers – Risks to construction workers include physical hazards from heavy construction equipment and work adjacent to surface water. Chemical hazards would be present related to inhalation of dust and direct contact with impacted soil. These risks are readily addressed with engineering controls (e.g., dust suppression) and personal protective gear (high visibility gear, personal flotation devices, gloves, etc.).

- Community – Impacts to the community are relatively limited because the site is located in an industrial area. There would be a short-term increase in truck traffic (resulting in risks from accidents, noise, pollution), but these activities would be similar to current industrial activities.
- Environment – There would be short-term degradation of the habitat on and adjacent to the riverbank. The finished source control measure would match or enhance the existing conditions (armor on the lower bank and native species on the upper bank). Equipment and trucks used for the work would be diesel powered, contributing greenhouse gases to the atmosphere. Assuming the soil borrow source and landfill are located 10 and 30 miles from the site, respectively, the project would generate approximately 16,000 to 25,000 truck miles.

Reasonableness of Cost. Table 3 (3a and 3b for Options 1 and 2) provides a detailed cost estimate for this alternative. Costs include direct/indirect capital costs (e.g., design, permitting, construction), annual operation/maintenance costs, and costs of periodic reviews. Costs are stated in terms of NPV, assuming that capital costs are incurred in year zero (i.e., there is no discount of capital costs, only long term costs). Costs for this alternative are summarized as follows with the ranges representing Options 1 and 2 for finished bank slope.

Capital	\$ 1,530,000 to 1,870,000
Long-Term (NPV)	\$ 330,000
Total	\$1,860,000 to 2,200,000

Treatment or Removal of Hot Spots. This alternative addresses a portion (with relatively higher concentrations) of the direct contact hot spots by removal to a permitted landfill. Direct contact hot spots (for terrestrial ecological receptors) would remain in the portion of the bank down river from the Gantry.

8.4 Alternative 4 – Removal

Description. For this alternative, soil that exceeds RAOs generally would be excavated for off-site disposal. The removal alternative would include the following elements.

- Soil exceeding RAOs would be excavated for off-site disposal in a Subtitle D landfill. Note that RAOs related to sediment apply only so long as the bank is unstable. Once stabilized, only upland RAOs apply. Subsequent to excavation/filling needed to stabilize the slope, the excavation depth would be three feet, corresponding to the presumed potential exposure depth for occupational or ecological receptors. Excavated soil may be processed through a mechanical screen to remove large rock and debris. Rock would be reused as armor for the finished bank. Metallic debris would be recycled. Based on the preliminary waste designation evaluation in Section 4.7, it is expected that without treatment a portion of the excavated soil would be designated as hazardous waste based on leachability of lead (soil beneath and upriver of the Gantry – approximately one-third of the excavated volume). Prior to removal from the site, soil failing leachability criteria for

characteristic hazardous waste would be stabilized to meet criteria for designation as solid waste. Portable equipment or hand excavation would be required beneath dock structures. Soil beneath the Gantry may contain asbestos debris. This soil would be removed using qualified personnel, asbestos-related engineering controls (e.g., dust control), and appropriate air monitoring. Excavation would not be completed beneath the Stevedore Building.

- The excavation would be backfilled such that the finish bank slope is within the range of 1.5H:1V to 3H:1V except beneath the docks and adjacent to the Stevedore Building. To maintain stability at those locations, rock buttress fill would be placed at maximum slopes of 1H:1V. Minimum depth of backfill would be three feet.
- The finished slope would be surfaced with materials designed to resist erosive forces of river action. This would consist of armor material on the lower slope and native vegetation or armor on the upper slope.
- A soil management plan would be prepared to describe proper soil handling in the event that the area must be disturbed in the future and to address construction/excavation worker risks (in limited areas near boring 3.2).
- A deed restriction identifying the presence of the contamination at depth would be included.
- Short-term risks during construction would be addressed through personal protective equipment and engineering controls (e.g., dust, erosion, sedimentation, and siltation controls).

Figure 9 shows the proposed excavation area, and Figure 10 presents representative slope cross-sections showing the finished slope materials and coordination of the source control remedy with the in-water remedial action.

The alternative construction would cover a total area of approximately 120,000 square feet. Construction material quantities are summarized below. Quantity calculations are presented in Appendix G (ranges represent Option 1 to Option 2, respectively).

- Excavation: 6,600 to 8,900 cy:
 - 900 to 1,400 cy unobstructed excavation and treatment;
 - 5,000 to 6,800 cy of unobstructed excavation without treatment;
 - 100 cy asbestos-containing soil and/or debris from beneath Gantry;
 - 600 cy of soil beneath structures (not including asbestos volume);
- Select fill: 4,700 to 5,600 cy;
- Common fill: 0 to 8,200 cy;
- Rip rap: 6,100 to 6,700 cy;

-
- Topsoil: 1,300 to 1,400 cy;
 - Jute mat: 2,000 to 4,200 square yards; and
 - Landscaping: 0.4 to 0.9 acres.

The project would require imported fill of 12,000 to 22,000 cy. Of that total, approximately 6,000 to 13,000 net cy of fill would be within the 100-year floodplain.

Operation and maintenance would include irrigation (first growing season), plant inspection and replacement, herbivore control, and invasive species control. A minimum of five years of active inspection and maintenance is expected to verify plants are established and the slope is stable. No long-term inspection would be required.

Protectiveness. This alternative is protective of human and ecological receptors by removing soil exceeding RAOs and stabilizing bank slopes. A very small area at depths greater than three feet in the vicinity of boring 3.2 would exceed construction/excavation worker RBCs – this risk would be addressed through institutional and engineering controls. The flattened, stabilized river bank slope assures long-term effectiveness.

Effectiveness. Removing soil to a permitted landfill is very effective because the landfills have strict operational, closure, and monitoring requirements. Stabilization of slopes beneath structures with rock buttress is very effective and does not require long-term maintenance. The alternative is estimated to require less than six months to complete (not counting permitting time) and it would be protective immediately after implementation. This alternative would be designed to address ARARs listed in Appendix F, including actions related to discharges to the river, waste handling and transportation, impacts to fish and wildlife, flood impacts, PCB wastes, state cleanup laws, and air discharges. The action would be contained entirely within dock structures and the filled riverbank so navigation, historical, and archeological issues would not likely be relevant or applicable.

Long-Term Reliability. The long-term reliability of this alternative requires establishing a healthy native plant system on the upper bank. Permitted landfills require long-term maintenance but generally provide good long-term reliability. The rock buttress will perform well without long-term maintenance. The reduction in the river bank slope greatly increases overall stability and therefore the long-term reliability of the alternative.

Implementability. This alternative uses standard construction services that are readily available. Access to the site is available from land through the Schnitzer ASD Yard. Access to beneath the dock structures is restricted for most construction equipment. Special construction requirements would be needed for removal of the asbestos debris. In-water permitting, including consultation with natural resource agencies, would be required. The project would result in approximately 6,000 to 13,000 cy of fill within the 100-year floodplain.

The project would require on the order of 1,900 to 3,100 truck trips to the facility, assuming 20 cy per truck and two trips per load. As shown on Figure 10, this alternative is compatible with currently proposed in-water remedies. This alternative would reduce available usable land on the Schnitzer ASD Yard by approximately 0.4 to 0.6 acre.

Implementation Risk. Implementation risks include potential impacts to site workers, the community, and the environment during implementation, summarized as follows.

- Site Workers – Risks to construction workers include physical hazards from heavy construction equipment and work adjacent to surface water. Chemical hazards would be present related to inhalation of dust and direct contact with impacted soil. These risks are readily addressed with engineering controls (e.g., dust suppression) and personal protective gear (high visibility gear, personal flotation devices, gloves, etc.).
- Community – Impacts to the community are relatively limited because the site is located in an industrial area. There would be a short-term increase in truck traffic (resulting in risks from accidents, noise, pollution), but these activities would be similar to current industrial activities.
- Environment – There would be short-term degradation of the habitat on and adjacent to the riverbank. The finished source control measure would match or enhance the existing conditions (armor on the lower bank and native species on the upper bank). Equipment and trucks used for the work would be diesel powered, contributing greenhouse gases to the atmosphere. Assuming the soil borrow source and landfill are located 10 and 30 miles from the site, respectively, the project would generate approximately 32,000 to 49,000 truck miles.

Reasonableness of Cost. Table 4 (4a and 4b for Options 1 and 2) provides a detailed cost estimate for this alternative. Costs include direct/indirect capital costs (e.g., design, permitting, construction), annual operation/maintenance costs, and costs of periodic reviews. Costs are stated in terms of NPV, assuming that capital costs are incurred in year zero (i.e., there is no discount of capital costs, only long term costs). Costs for this alternative are summarized as follows with the ranges representing Options 1 and 2 for finished bank slope.

Capital	\$ 2,000,000 to 2,630,000
Long-Term (NPV)	<u>\$ 100,000</u>
Total	\$ 2,100,000 to 2,730,000

Treatment or Removal of Hot Spots. This alternative addresses the potential direct contact hot spots by removal to a permitted landfill.

9.0 Comparative Evaluation of Source Control Alternatives

This section of the FS presents an evaluation of the source control alternatives relative to one another. The comparative analysis is summarized in Table 5. In the table, each alternative is compared to each of the other alternatives for each evaluation criterion. An alternative is ranked as favorable (+), equal (0), or unfavorable (-) in relation to every other alternative, corresponding to respective scores of 1, 0, or -1. The scores are summed at the right of the table for each alternative and the alternatives are ranked. The following discussion provides a rational for the comparative evaluation presented in Table 5.

9.1 Protectiveness

This criterion is pass/fail. An alternative must be protective as defined by OAR 340-122-040 to be acceptable. With the exception of the No Action alternative, each of the source control alternatives would be protective of human health and the environment. The alternatives were not scored based on this criterion, but protectiveness was considered when ranking the alternatives in the right-hand column.

9.2 Effectiveness

The No Action alternative was not considered an effective source control measure. The remaining alternatives would each require approximately the same time to achieve protection. The alternatives were ranked for effectiveness based primarily on the amount of material removed to a landfill – alternatives with greater material removed from the site were ranked higher.

9.3 Long Term Reliability

The No Action alternative was not considered a reliable source control measure. Generally, disposal in a landfill is considered to be more reliable than on-site capping. Therefore, alternatives with greater quantities disposed off-site were considered to be more reliable.

9.4 Implementability

The No Action alternative was considered the most easily implemented source control measure. The remaining alternatives have similar concerns with respect to work below structures and permitting. Primary differences are relative to reduction of useable land area and total number of truck trips that may impact site operations. The differences in useable land area are small. The removal alternative results in a smaller reduction in useable land but has more impact on site operations. Overall, each of the active alternatives has generally the same level of implementability.

9.5 Implementation Risk

The No Action alternative carries no implementation risk and is thus ranked highest. The remaining alternatives have similar implementation risk except in terms of greenhouse gas impacts. Alternatives with greater removal quantities have larger impacts on the environment so are ranked lower.

9.6 Reasonableness of Cost

Cost estimates were developed for each of the source control alternatives. The following list summarizes the present-worth total cost estimates for each alternative:

- No Action – \$0;
- Cap – \$1,400,000 to 1,740,000;
- Focused Removal and Cap – \$1,860,000 to 2,200,000; and
- Removal – \$2,100,000 to 2,730,000.

9.7 Compatibility with In-Water Cleanup

Figures 6 and 10 show how each active alternative would be coordinated with the in-water remedies. The potential alternatives would be compatible with proposed in-water remedies.

9.8 Treatment or Removal of Hot Spots

The cap alternative does not address the high-concentration hot spots resulting from potential direct contact by terrestrial receptors. The partial removal/cap alternative addresses the higher-concentration portions of the hot spots by removal to an off-site landfill. The removal alternative addresses the high-concentration (i.e., direct contact) hot spots by removal to an off-site landfill.

10.0 Recommendation

10.1 Recommended Source Control Alternative

Based on the evaluation of source control alternatives in Section 9, the recommended source control action for the site is capping. This alternative is recommended for the following reasons.

- The alternative is protective of human health and the environment through a combination of stabilization of the riverbank slope and capping of soils on the riverbank. The point of compliance would be surface soil throughout the riverbank.
- Overall, each of the alternatives was equally ranked when considering the balancing factors with equal weighting. When alternatives are equally ranked based on the balancing factors, the lower cost alternative is the preferred alternative.

-
- This alternative does not treat or remove high-concentration hot spots for direct contact by ecological terrestrial receptors. Even with the proposed plantings in the alternative, because of the industrial nature of the facility, the habitat is relatively poor and the actual risk from the hot spots would be low. Given the relatively high cost to remove the hot spots (greater than 50 percent increase in total cost), the marginal benefit for hot spot removal is not sufficient to warrant removal of the direct contact hot spots.

10.2 Permit Requirements and Periodic Reviews

To conduct work below the ordinary high water level, a Clean Water Act Section 404 Permit would be required. The Section 404 permit may impose limitations on construction timing, design details, and mitigation needs. Mitigation requirements were not included in the alternative scopes or costs. A development permit (or permit exemption) from the City of Portland, including a review for Greenway criteria, would be required for earthwork and landscaping.

The proposed alternative is a robust design for stabilization of the bank. Periodic reviews would not likely be needed, but could be done as part of the periodic reviews that will be conducted for the in-water remedy.

10.3 Residual Risk Assessment

Assessment of residual risk is intended to assist managers in determining whether the source control measure will result in acceptable risk. Unacceptable baseline risks were identified based on potential for migration of bank soil to river sediments and direct contact of human and terrestrial receptors with surface soils. Each of these pathways is addressed below.

Migration of Bank Soil to River Sediments. The finished river bank will be at slopes that will have factors of safety against movement that exceed industry standard factors of safety for long-term stability. Surface finish of slopes will include armoring on the lower bank and vegetation on the upper bank that will prevent erosion. Resulting risks of migration of bank soil to the river will be acceptable.

Direct Contact with Surface Soil. Surface soil would be capped to prevent contact by terrestrial ecological receptors and occupational/industrial workers. The imported soil (excluding rip rap) used for cap material would be tested prior to placement to verify concentrations of COCs are acceptable. After placement of the fill, the concentrations of COCs in surface soil would meet Portland Harbor clean fill requirements. The site would meet acceptable risk levels. The risk levels managed by the cap are the same as the baseline risks discussed in the risk screening in Section 3.

11.0 References

Ash Creek Associates, 2012. *Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation and Focused Feasibility Study Work Plan*. August 2012.

DEQ/EPA, 2005. *Portland Harbor Joint Source Control Strategy – Final* (Screening Criteria Spreadsheet Revised July 16, 2007). December 2005.

DEQ, 2006. *Guidance for Conducting Feasibility Studies, Waste Management and Cleanup Division*. Issued July 1, 1998 – Updated November 1, 2006.

DEQ, 2014. Letter to David Harvey, The Greenbrier Companies, *Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study Work Plan*. February 26, 2014.

EPA, 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*. EPA 540-R-93-057, OSWER 9360.0-32. August 1993.

EPA, 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. EPA 540-R-00-002, OSWER 9355.0-75. July 2000.

Flowing Solutions and Gunderson, 2012. *Evaluation of Potential for Erosion of Riverbank Soils and Proposed Interim Measures at the Schnitzer ASD Yard*. Undated (submitted to DEQ May 1, 2012).

FMC, 1982. *FMC Berthage Agreement with Zidell Explorations, Inc.* September 1982.

Integral Consulting, Inc.; Windward Environmental, LLC; Kennedy/Jenks Consultants; and Anchor QEA, LLC, 2012. *Portland Harbor RI/FS, Remedial Investigation Report, Draft*. March 2012.

Shaw Environmental, Inc., 2011. *Area 3 – Erodible and Riverbank Soils Source Control Evaluation (SCE), Gunderson Facility, Portland, Oregon*. October 2011.

Squire/Kleinfelder, 2005. *Remedial Investigation, Gunderson Area 3, Former Schnitzer Steel Yard, Portland, Oregon*. April 2005.

U.S. Army Corps of Engineers, 2004. *Portland-Vancouver Harbor Information Package, Second Edition, Reservoir Regulation and Water Quality Section*. November 2004.

Table 1
Initial Screening and Evaluation of Technologies
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

General Response Action	Technology	Description	Evaluation Criteria					Screening Comments
			Protectiveness/ Short-Term Effectiveness	Permanence/ Long-Term Effectiveness	Costs	Implementability	Management of Short-Term Risks	
NO ACTION	None	No Action.	--	--	++	++	++	Is not effective, but is retained in accordance with FS rules and guidance as baseline for comparison.
INSTITUTIONAL CONTROLS	Legal Restrictions, Regulations, and Covenants	May include restrictions such as: deed restrictions, easements, and covenants attached to property-related documents; legal bans or controls of activities (e.g., fishing).	0	-	++	0	+	Applicable to document presence of impacts and controls for future property owners. Must be used in conjunction with other technologies.
	Soil Management Plan	Development and publication of protocols for handling and managing contaminated soils during future work to protect workers, public health, ecological exposures, and the environment.	0	-	++	+	+	Applicable to assure that engineering controls or containment remain effective. Must be used with other technologies.
	Signage/Notifications/Advisories	Posting of signs and/or distribution of notifications regarding health concerns in area of contamination.	0	0	+	+	+	Although potentially applicable to address human health, it does not address migration to the river or terrestrial ecological. However, can be used to assure effectiveness of other technologies such as capping or bank stabilization.
ENGINEERING CONTROLS	Access Restriction	Restrict access with a physical barrier such as fencing to prevent or control contact with contaminated soil.	0	0	+	+	+	Although potentially applicable to address human health, it does not address migration to the river or terrestrial ecological. However, can be used to assure effectiveness of other technologies such as capping or bank stabilization.
	Shoreline Stabilization	The shoreline would be stabilized by grading to flatten slopes, placing erosion resistant materials such as rip-rap or bulkheads, and/or placing biological materials such as logs and vegetation to prevent erosion or mass wasting of the bank.	+	+	-	0	+	Applicable to address pathways to sediment. Would not directly address upland/terrestrial concerns but could easily be combined with other technologies such as capping.
	Vapor Controls	Installation/operation of controls to prevent vapor migration into structures. Could include adjustment of HVAC system; low-permeability barriers beneath structures; sealants on floor slabs; or sub-slab venting systems	-	-	+	-	-	Not applicable. COCs are non-volatile.
	Monitoring	Laboratory analysis of soil samples to document soil conditions.	NA	NA	+	+	+	Applicable only to documenting site conditions and the effectiveness of other technologies.
CONTAINMENT	Cap	Installation of cover to prevent contact with contaminated soil.	++	+	-	0	+	Applicable as a primary technology to address site risks. Would likely need to be paired with shoreline stabilization to address long-term integrity of cap.
REMOVAL	Excavation	Soil would be excavated from the riverbank to eliminate direct contact and migration to the river. Excavated soil would be disposed in a controlled facility.	++	++	--	-	+	Applicable. Would need to be paired with an appropriate disposal technology. Would likely need additional technologies such as bank stabilization, and could require treatment prior to disposal.
	On-Site Disposal	Consolidate excavated soil in an on-site, capped disposal area such as a landscaped berm along the top of bank.	++	-	--	--	0	Conceptually applicable. However, given the relatively large quantity of hot spot soil, off-site disposal with similar costs would get preference over on-site disposal.
	Off-Site Disposal	Off-site disposal of excavated soil at licensed disposal facility. Soils would require waste profiling and approval by the disposal facility. Soil could require treatment (e.g., stabilization to reduce leachability of metals) prior to disposal.	++	++	--	0	+	Applicable. Disposal in a controlled landfill is generally recognized as effective and permanent. Meets requirements for addressing hot spots.

Please see notes at end of table.

Table 1
Initial Screening and Evaluation of Technologies
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

General Response Action	Technology	Description	Evaluation Criteria					Screening Comments
			Protectiveness/ Short-Term Effectiveness	Permanence/ Long-Term Effectiveness	Costs	Implementability	Management of Short-Term Risks	
<i>IN SITU</i> BIOLOGICAL TREATMENT	Bioventing	Delivering oxygen to contaminated (unsaturated) soils by forced air movement to stimulate biodegradation.	--	--	0	--	0	This treatment is not effective with metals. Shallow soil is already partially uncovered and likely well oxygenated, therefore this treatment would not be effective beyond current conditions. Does not address erosion in short term.
	Enhanced Bioremediation (Bioaugmentation, Biostimulation)	Adding nutrients, electron donors/acceptors, selected microbial cultures, or other amendments to enhance bioremediation.	-	-	-	--	0	Metals are not readily amenable to enhanced biodegradation, with low degradation rates. Less suitable for unsaturated soil. Does not address erosion in short term.
	Land Treatment	Combination of aeration (tilling) and amendments to enhance bioremediation in surface soils.	--	--	-	--	-	Not ammenable with prevention of erosion.
	Natural Attenuation	Using natural processes to reduce contaminant concentrations to acceptable levels.	--	--	++	++	++	Natural processes likely will not reduce contaminant concentrations to acceptable levels within reasonable timeframe (> 20 years). Does not address erosion in short term.
	Phytoremediation	Using plants to remove, transfer, stabilize, or destroy contaminants in soil.	--	-	-	--	0	Limited short-term effectiveness. High initial cost if implemented in entire remedial action area. Does not address erosion in short term.
<i>IN SITU</i> PHYSICAL/ CHEMICAL/ THERMAL TREATMENT	Chemical Oxidation	Mix reagent into the soil to chemically convert hazardous contaminants to less toxic compounds by oxidation.	-	-	--	--	--	Relatively high cost and implementation risk. Delivery to shallow unsaturated soil would be difficult. Doesn't address all COCs. Would not protect against erosion into river. Significant implementation risk to river.
	Electrokinetic Separation	Use of electrochemical/electrokinetic processes to desorb and remove metals and polar organics.	0	0	-	--	-	Would require introduction of surfactant or organic modifier. Less effective in shallow soil (would need to include flushing and capture). Does not protect against erosion.
	Fracturing	Development of cracks in low permeability or overconsolidated soils to create passageways that increase the effectiveness of other <i>in situ</i> processes and extraction technologies.	NA	NA	+	--	+	Applicable only to improve effectiveness of other technologies. Not necessary for site conditions (primarily coarse-grained soil). Not effective in shallow soil.
	Low-Flow Ventilation	Low-flow fan used to create low pressure directly beneath building slabs and prevent vapor migration into buildings.	--	--	0	--	--	Not effective for site conditions consisting of shallow uncovered soil contaminated by semi-volatile compounds.
	Soil Flushing	Water (or water containing an additive to enhance contaminant solubility) is circulated through the soil to desorb contaminants, recovered, and treated.	-	-	--	-	-	Would require surfactant and circulation infrastructure. Not cost effective for large scale area. Significant implementation risk to river.
	Soil Vapor Extraction	Vacuum is applied through vapor extraction wells to create a pressure/concentration gradient that induces vapor-phase volatiles to be removed from soil.	--	--	-	--	--	Not effective for non-volatile compounds typical of site COCs.
	Solidification/ Stabilization/ Vitrification	Reagents or energy are introduced into the soil such that contaminants are physically bound or enclosed within a stabilized mass (solidification and vitrification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	+	0	--	-	-	High implementation cost. Significant implementation risk to river.
	Thermally Enhanced Soil Vapor Extraction Treatment	High energy injection (steam/hot air, electrical resistance, electromagnetic, fiber optic, radio frequency) is used to increase the volatilization rate of semi-volatiles and facilitate extraction.	-	--	--	--	-	Not effective for most COCs.

Please see notes at end of table.

Table 1
Initial Screening and Evaluation of Technologies
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

General Response Action	Technology	Description	Evaluation Criteria					Screening Comments
			Protectiveness/ Short-Term Effectiveness	Permanence/ Long-Term Effectiveness	Costs	Implementability	Management of Short-Term Risks	
EX SITU BIOLOGICAL TREATMENT	Biopiles	Excavated soils are mixed with soil amendments and placed in aboveground enclosures and aerated with blowers or vacuum pumps.	-	0	0	-	-	Some target compounds (i.e. metals) not readily conducive to this treatment. Limited space available.
	Composting	Excavated soil is mixed with bulking agents and organic amendments to promote microbial activity.	-	0	0	-	-	Degradation of target compounds using microbial enhancement is slow. Does not address all COCs.
	Landfarming	Excavated soil is placed in lined beds and periodically tilled to aerate the soil.	-	0	0	--	-	Many target COCs not conducive to biodegradation. Limited space available.
	Slurry Phase Biological Treatment	An aqueous slurry of soil and other additives is mixed to keep solids suspended and microorganisms in contact with the soil contaminants. When complete, the slurry is dewatered and the soil is disposed of.	0	0	--	--	-	Handling of slurry and waste water is unnecessarily complex and expensive. Does not address all COCs.
EX SITU PHYSICAL/ CHEMICAL/ THERMAL TREATMENT	Chemical Extraction	Excavated soil is mixed with an extractant which dissolves the contaminants. The resultant solution is placed in a separator to remove the contaminant/extractant mixture for treatment.	+	+	--	-	-	Would require multiple processes for all COCs increasing complexity and cost. Additional treatment would be required for recovered extractant.
	Incineration	High temperatures are used to combust (in the presence of oxygen) organic constituents in hazardous wastes.	+	+	--	-	-	Requires off-site transport to distant facility. Is expensive relative to other acceptable treatment/disposal technologies. Very effective for organic COCs, but not for metals.
	Soil Washing	Contaminants are separated from the excavated soil with wash-water augmented with additives to help remove organics.	0	0	--	-	-	Does not address metals COCs. Additional treatment would be required for wash water.
	Dehalogenation	Reagents are added to soils contaminated with halogenated organics to remove halogen molecules.	-	-	-	-	-	Does not address all COCs.
	Solar Detoxification	Contaminants are destroyed by photochemical and thermal reactions using ultraviolet energy in sunlight.	-	0	--	--	-	Marginally effective with some COCs. Limited land space. Does not address metals COCs.
	Solidification/ Stabilization/ Vitrification	Contaminants are physically bound or enclosed within a stabilized mass (solidification and vitrification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	+	+	-	-	0	Stabilization is an effective technology to address leachable COCs prior to land disposal.
	Thermal Desorption/ Pyrolysis/ Hot Gas Decontamination	Waste soils are heated to either volatilize (desorption and hot gas) or to anaerobically decompose (pyrolysis) organic contaminants. Off-gas is collected and treated.	+	+	--	-	-	Effective for organics. Requires off-site transport to distant facility. Is expensive relative to other acceptable treatment/disposal technologies. Does not address metals COCs.
	Separation	Separation techniques concentrate contaminated solids through physical, magnetic, and/or chemical means. Screening removes uncontaminated rock and/or debris (e.g., steel) that can be recycled.	-	0	-	-	-	Much of the riverbank includes rip rap and metal debris that can be removed by sieving.

Notes:

1. Shading represents technologies that have been eliminated from consideration.
2. Technology Rating: (++) Very Positive; (+) Positive; (0) Neutral; (-) Negative; (-) Very Negative

Table 2a**Cost Estimate – Cap Option 1 (1.5H:1V)****Schnitzer ASD Yard Riverbank Feasibility Study****Gunderson, LLC. - Portland, Oregon**

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment; does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
			Design and Procurement Subtotal	\$255,000
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract Assume 10% construction total (excluding tip fees); includes contractor work plans
Mobilization	1 LS	\$56,610 /each	\$56,700	Means
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est; Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2 months	\$3,410 /month	\$6,900	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2 months	\$6,400 /month	\$12,800	Estimated from similar project costs
Survey Control	3.9 ac	\$2,200 /ac	\$8,600	Means
Dust Control	30 day	\$400 /day	\$12,000	Water truckedriver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.9 ac	\$920 /ac	\$3,600	Means (shrub/brush mowing)
Site Grading	0 cy	\$3 /cy	\$0	Means
Debris Load/Haul	0 cy	\$20 /cy	\$0	\$2/cy to load: 20 cy/load, 3-hr round trip, \$120/hr
Debris Landfill Tip Fee	0 ton	\$50 /ton	\$0	Assume 1.5 ton/cy for debris
Purchase/Deliver Common Fill	0 cy	\$14 /cy	\$0	Means
Purchase/Deliver Rip Rap	6,100 cy	\$24 /cy	\$148,900	Means
Purchase/Deliver Select Fill	4,700 cy	\$17 /cy	\$81,700	Means
Purchase/Deliver Topsoil	1,300 cy	\$20 /cy	\$26,400	Means
Demarcation Fabric	7,200 sy	\$2.02 /sy	\$14,600	Means
Place and Compact (Unrestricted)	9,500 cy	\$6 /cy	\$57,000	Means
Place and Compact (Restricted)	2,600 cy	\$50 /cy	\$130,000	Means; plus 50% premium for placement on asbestos soil
Jute Mat	2,000 sy	\$1.64 /sy	\$3,300	Means
Re-Vegetation (forested)	0.4 ac	\$41,000 /ac	\$16,400	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	0.4 ac	\$6,560 /ac	\$2,700	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$62,280 /each	\$62,300	Assume 10% of construction - professional judgment
			Construction Subtotal	\$686,000
Oversight and Reporting				
Construction Management	35 day	\$500 /day	\$17,500	Professional judgment
Engineering Oversight	30 day	\$1,500 /day	\$45,000	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEO/EPA)	20 %	\$187,500 /each	\$37,500	Assumed 20% of engineering costs
			Oversight and Reporting Subtotal	\$120,000
Long-Term (Net Present Value)				
Cap Inspection and Maintenance (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Long-Term Annual Inspections (Yr 6-40)	35 yr	\$5,000 /yr	\$115,800	Inspections only years 5 through 30 (w/ summary letter)
Agency Oversight (DEO/EPA)	10 %	\$301,800 /each	\$30,200	Assumed 10% of engineering costs
			Long-Term Subtotal (Net Present Value)	\$332,000
Contingency				
Contingency	0 %	\$1,393,000	\$0	
Total			Total	\$1,400,000

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 2b
Cost Estimate – Cap Option 2 (3H:1V)
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment; does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
			Design and Procurement Subtotal	\$255,000
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract Assume 10% construction total (excluding tip fees); includes contractor work plans
Mobilization	1 LS	\$81,390 /each	\$81,400	Means
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est; Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2 months	\$3,410 /month	\$6,900	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2 months	\$6,400 /month	\$12,800	Estimated from similar project costs
Survey Control	3.9 ac	\$2,200 /ac	\$8,600	Means
Dust Control	35 day	\$400 /day	\$14,000	Water truckedriver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.9 ac	\$920 /ac	\$3,600	Means (shrub/brush mowing)
Site Grading	3,200 cy	\$3 /cy	\$8,300	Means
Debris Load/Haul	320 cy	\$20 /cy	\$6,400	\$2/cy to load: 20 cy/load, 3-hr round trip, \$120/hr
Debris Landfill Tip Fee	480 ton	\$50 /ton	\$24,000	Assume 1.5 ton/cy for debris
Purchase/Deliver Common Fill	4,600 cy	\$14 /cy	\$63,400	Means
Purchase/Deliver Rip Rap	6,700 cy	\$24 /cy	\$163,500	Means
Purchase/Deliver Select Fill	3,800 cy	\$17 /cy	\$66,100	Means
Purchase/Deliver Topsoil	4,300 cy	\$20 /cy	\$87,200	Means
Demarcation Fabric	14,100 sy	\$2.02 /sy	\$28,500	Means
Place and Compact (Unrestricted)	16,800 cy	\$6 /cy	\$100,800	Means
Place and Compact (Restricted)	2,600 cy	\$50 /cy	\$130,000	Means; plus 50% premium for placement on asbestos soil
Jute Mat	6,500 sy	\$1.64 /sy	\$10,700	Means
Re-Vegetation (forested)	1.3 ac	\$41,000 /ac	\$53,300	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	1.3 ac	\$6,560 /ac	\$8,600	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$91,930 /each	\$92,000	Assume 10% of construction - professional judgment
			Construction Subtotal	\$1,012,000
Oversight and Reporting				
Construction Management	40 day	\$500 /day	\$20,000	Professional judgment
Engineering Oversight	35 day	\$1,500 /day	\$52,500	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEO/EPA)	20 %	\$197,500 /each	\$39,500	Assumed 20% of engineering costs
			Oversight and Reporting Subtotal	\$132,000
Long-Term (Net Present Value)				
Cap Inspection and Maintenance (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Long-Term Annual Inspections (Yr 6-40)	35 yr	\$5,000 /yr	\$115,800	Inspections only years 5 through 30 (w/ summary letter)
Agency Oversight (DEO/EPA)	10 %	\$301,800 /each	\$30,200	Assumed 10% of engineering costs
			Long-Term Subtotal (Net Present Value)	\$332,000
Contingency				
Contingency	0 %	\$1,731,000	\$0	
Total			Total	\$1,740,000

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 3a

Cost Estimate – Focused Removal and Cap Option 1 (1.5H:1V)

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment; does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
		Design and Procurement Subtotal	\$255,000	
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract Assume 10% construction total (excluding tip fees); includes contractor work plans
Mobilization	1 LS	\$71,100 /each	\$71,100	Means
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est; Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2 months	\$3,410 /month	\$6,900	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2 months	\$6,400 /month	\$12,800	Estimated from similar project costs
Survey Control	3.9 ac	\$2,200 /ac	\$8,600	Means
Dust Control	35 day	\$400 /day	\$14,000	Water truckedriver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.9 ac	\$920 /ac	\$3,600	Means (shrub/brush mowing)
Site Grading	0 cy	\$3 /cy	\$0	Means
Debris Load/Haul	130 cy	\$20 /cy	\$2,600	\$2/cy to load; 20 cy/load, 3-hr round trip, \$120/hr
Debris Landfill Tip Fee	195 ton	\$50 /ton	\$9,800	Assume 1.5 ton/cy for debris
Soil Excavate and Treat	1,300 cy	\$84 /cy	\$109,100	Excavation from Means; Treatment from costs for similar project
Treated Soil Load and Haul	1,560 cy	\$20 /cy	\$31,200	Increased volume for additive and fluff factor
Treated Soil Landfill Tip Fee	2,808 ton	\$87 /ton	\$245,300	Assume 1.8 ton/cy for treated soil
Purchase/Deliver Common Fill	0 cy	\$14 /cy	\$0	Means
Purchase/Deliver Rip Rap	6,100 cy	\$24 /cy	\$148,900	Means
Purchase/Deliver Select Fill	4,700 cy	\$17 /cy	\$81,700	Means
Purchase/Deliver Topsoil	1,300 cy	\$20 /cy	\$26,400	Means
Demarcation Fabric	7,200 sy	\$2.02 /sy	\$14,600	Means
Place and Compact (Unrestricted)	9,500 cy	\$6 /cy	\$57,000	Means
Place and Compact (Restricted)	2,600 cy	\$50 /cy	\$130,000	Means; plus 50% premium for placement on asbestos soil
Jute Mat	2,000 sy	\$1.64 /sy	\$3,300	Means
Re-Vegetation (forested)	0.4 ac	\$41,000 /ac	\$16,400	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	0.4 ac	\$6,560 /ac	\$2,700	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$103,720 /each	\$103,800	Assume 10% of construction - professional judgment
		Construction Subtotal	\$1,141,000	
Oversight and Reporting				
Construction Management	40 day	\$500 /day	\$20,000	Professional judgment
Engineering Oversight	35 day	\$1,500 /day	\$52,500	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEO/EPA)	20 %	\$197,500 /each	\$39,500	Assumed 20% of engineering costs
		Oversight and Reporting Subtotal	\$132,000	
Long-Term (Net Present Value)				
Cap Inspection and Maintenance (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Long-Term Annual Inspections (Yr 6-40)	35 yr	\$5,000 /yr	\$115,800	Inspections only years 5 through 30 (w/ summary letter)
Agency Oversight (DEO/EPA)	10 %	\$301,800 /each	\$30,200	Assumed 10% of engineering costs
		Long-Term Subtotal (Net Present Value)	\$332,000	
Contingency				
Contingency	0 %	\$1,860,000	\$0	
Total			Total	\$1,860,000

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 3b

Cost Estimate – Focused Removal and Cap Option 2 (3H:1V)

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment; does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
		Design and Procurement Subtotal	\$255,000	
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract Assume 10% construction total (excluding tip fees); includes contractor work plans
Mobilization	1 LS	\$95,900 /each	\$95,900	Means
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est; Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2 months	\$3,410 /month	\$6,900	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2 months	\$6,400 /month	\$12,800	Estimated from similar project costs
Survey Control	3.9 ac	\$2,200 /ac	\$8,600	Means
Dust Control	40 day	\$400 /day	\$16,000	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.9 ac	\$920 /ac	\$3,600	Means (shrub/brush mowing)
Site Grading	2,400 cy	\$3 /cy	\$6,200	Means
Debris Load/Haul	370 cy	\$20 /cy	\$7,400	\$2/cy to load; 20 cy/load, 3-hr round trip, \$120/hr
Debris Landfill Tip Fee	555 ton	\$50 /ton	\$27,800	Assume 1.5 ton/cy for debris
Soil Excavate and Treat	1,300 cy	\$84 /cy	\$109,100	Excavation from Means; Treatment from costs for similar project
Treated Soil Load and Haul	1,560 cy	\$20 /cy	\$31,200	Increased volume for additive and fluff factor
Treated Soil Landfill Tip Fee	2,808 ton	\$87 /ton	\$245,300	Assume 1.8 ton/cy for treated soil
Purchase/Deliver Common Fill	4,800 cy	\$14 /cy	\$66,100	Means
Purchase/Deliver Rip Rap	6,700 cy	\$24 /cy	\$163,500	Means
Purchase/Deliver Select Fill	3,800 cy	\$17 /cy	\$66,100	Means
Purchase/Deliver Topsoil	4,300 cy	\$20 /cy	\$87,200	Means
Demarcation Fabric	14,100 sy	\$2.02 /sy	\$28,500	Means
Place and Compact (Unrestricted)	17,000 cy	\$6 /cy	\$102,000	Means
Place and Compact (Restricted)	2,600 cy	\$50 /cy	\$130,000	Means; plus 50% premium for placement on asbestos soil
Jute Mat	6,500 sy	\$1.64 /sy	\$10,700	Means
Re-Vegetation (forested)	1.3 ac	\$41,000 /ac	\$53,300	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	1.3 ac	\$6,560 /ac	\$8,600	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$132,800 /each	\$132,800	Assume 10% of construction - professional judgment
		Construction Subtotal	\$1,461,000	
Oversight and Reporting				
Construction Management	45 day	\$500 /day	\$22,500	Professional judgment
Engineering Oversight	40 day	\$1,500 /day	\$60,000	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEQ/EPA)	20 %	\$207,500 /each	\$41,500	Assumed 20% of engineering costs
		Oversight and Reporting Subtotal	\$144,000	
Long-Term (Net Present Value)				
Cap Inspection and Maintenance (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Long-Term Annual Inspections (Yr 6-40)	35 yr	\$5,000 /yr	\$115,800	Inspections only years 5 through 30 (w/ summary letter)
Agency Oversight (DEQ/EPA)	10 %	\$301,800 /each	\$30,200	Assumed 10% of engineering costs
		Long-Term Subtotal (Net Present Value)	\$332,000	
Contingency				
Contingency	0 %	\$2,192,000	\$0	
Total		Total	\$2,200,000	

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 4a

Cost Estimate – Removal Option 1 (1.5H:1V)
 Schnitzer ASD Yard Riverbank Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment: does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
			Design and Procurement Subtotal	\$255,000
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract
Mobilization	1 LS	\$86,410 /each	\$86,500	Assume 10% construction total (excluding tip fees); includes contractor work plans
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est: Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2.5 months	\$3,410 /month	\$8,600	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2.5 months	\$6,400 /month	\$16,000	Estimated from similar project costs
Survey Control	3.4 ac	\$2,200 /ac	\$7,500	Means
Dust Control	40 day	\$400 /day	\$16,000	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.4 ac	\$920 /ac	\$3,200	Means (shrub/brush mowing)
Soil Excavate and Treat	900 cy	\$84 /cy	\$75,600	Excavation from Means; Treatment from costs for similar project: one-third volume treated
Soil Excavate w/o Treat	5,000 cy	\$10 /cy	\$50,000	Excavation from Means
Asbestos Soil Excavate and Treat	100 cy	\$168 /cy	\$16,800	Assume 100% premium for obstructed excavation and asbestos
Soil Obstructed Excavate w/o Treat	400 cy	\$20 /cy	\$8,000	Assume 100% premium for obstructed excavation
Soil Obstructed Excavate and Treat	200 cy	\$126 /cy	\$25,200	Assume 50% premium for obstructed excavation
Soil Load and Haul	7,920 cy	\$20 /cy	\$158,400	Increased volume for additive and fluff factor
Non-asbestos Soil Landfill Tip Fee	12,480 ton	\$40 /ton	\$499,200	Assume 1.6 ton/cy for treated soil
Treated Asbestos Soil Landfill Tip Fee	192 ton	\$80 /ton	\$15,400	Assume 1.6 ton/cy for treated soil; double tip fee for asbestos
Purchase/Deliver Common Fill	0 cy	\$14 /cy	\$0	Means
Purchase/Deliver Rip Rap	6,100 cy	\$24 /cy	\$148,900	Means
Purchase/Deliver Select Fill	4,700 cy	\$17 /cy	\$81,700	Means
Purchase/Deliver Topsoil	1,300 cy	\$20 /cy	\$26,400	Means
Demarcation Fabric	0 sy	\$2.02 /sy	\$0	Means
Place and Compact (Unrestricted)	9,500 cy	\$6 /cy	\$57,000	Means
Place and Compact (Restricted)	2,600 cy	\$33 /cy	\$85,800	Means
Jute Mat	2,000 sy	\$1.64 /sy	\$3,300	Means
Re-Vegetation (forested)	0.4 ac	\$41,000 /ac	\$16,400	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	0.4 ac	\$6,560 /ac	\$2,700	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$144,980 /each	\$145,000	Assume 10% of construction - professional judgment
			Construction Subtotal	\$1,595,000
Oversight and Reporting				
Construction Management	45 day	\$500 /day	\$22,500	Professional judgment
Engineering Oversight	40 day	\$1,500 /day	\$60,000	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEQ/EPA)	20 %	\$207,500 /each	\$41,500	Assumed 20% of engineering costs
			Oversight and Reporting Subtotal	\$144,000
Long-Term (Net Present Value)				
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Agency Oversight (DEQ/EPA)	10 %	\$93,000 /each	\$9,300	Assumed 10% of engineering costs
			Long-Term Subtotal (Net Present Value)	\$102,000
Contingency				
Contingency	0 %	\$2,096,000	\$0	
Total				
Total \$2,100,000				

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 4b

Cost Estimate – Removal Option 2 (3H:1V)
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Design, Permitting, and Procurement				
Work Plan Preparation	1 LS	\$20,000 /each	\$20,000	For DEQ review and approval
Drawings and Specifications	1 LS	\$50,000 /each	\$50,000	Assume public bid; 10 design sheets at \$5,000 per sheet
Permitting	1 LS	\$150,000 /each	\$150,000	Professional judgment: does not include mitigation costs
Procurement/Contracting	1 LS	\$15,000 /each	\$15,000	Professional judgment
Soil Management Plan/Institutional Controls	1 LS	\$20,000 /each	\$20,000	Professional judgment
			Design and Procurement Subtotal	\$255,000
Construction				
Utility Locating	16 hr	\$70 /hr	\$1,200	Unit rate from recent subcontract
Mobilization	1 LS	\$121,260 /each	\$121,300	Assume 10% construction total (excluding tip fees); includes contractor work plans
Erosion Control	1,500 lf	\$1.06 /foot	\$1,600	Means
Turbidity Controls	1,500 lf	\$21 /foot	\$31,000	Vendor cost est: Type II silt curtain
Construction Entrance	1 LS	\$1,500 /each	\$1,500	25 x 60 rock construction entrance (per City req's)
Erosion/Turbidity Control Maintenance	2.5 months	\$3,410 /month	\$8,600	10% of Erosion/Turbidity Control and Construction Entrance
Water Quality Monitoring	2.5 months	\$6,400 /month	\$16,000	Estimated from similar project costs
Survey Control	3.4 ac	\$2,200 /ac	\$7,500	Means
Dust Control	45 day	\$400 /day	\$18,000	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Site Clearing (unforested)	3.4 ac	\$920 /ac	\$3,200	Means (shrub/brush mowing)
Soil Excavate and Treat	1,400 cy	\$84 /cy	\$117,500	Excavation from Means; Treatment from costs for similar project: one-third volume treated
Soil Excavate w/o Treat	6,800 cy	\$10 /cy	\$68,000	Excavation from Means
Asbestos Soil Excavate and Treat	100 cy	\$168 /cy	\$16,800	Assume 100% premium for obstructed excavation and asbestos
Soil Obstructed Excavate w/o Treat	400 cy	\$20 /cy	\$8,000	Assume 100% premium for obstructed excavation
Soil Obstructed Excavate and Treat	200 cy	\$126 /cy	\$25,200	Assume 50% premium for obstructed excavation
Soil Load and Haul	10,680 cy	\$20 /cy	\$213,600	Increased volume for additive and fluff factor
Non-asbestos Soil Landfill Tip Fee	16,896 ton	\$40 /ton	\$675,900	Assume 1.6 ton/cy for treated soil
Treated Asbestos Soil Landfill Tip Fee	192 ton	\$80 /ton	\$15,400	Assume 1.6 ton/cy for treated soil; double tip fee for asbestos
Purchase/Deliver Common Fill	8,200 cy	\$14 /cy	\$113,000	Means
Purchase/Deliver Rip Rap	6,700 cy	\$24 /cy	\$163,500	Means
Purchase/Deliver Select Fill	5,600 cy	\$17 /cy	\$97,300	Means
Purchase/Deliver Topsoil	1,400 cy	\$20 /cy	\$28,400	Means
Demarcation Fabric	0 sy	\$2.02 /sy	\$0	Means
Place and Compact (Unrestricted)	19,300 cy	\$6 /cy	\$115,800	Means
Place and Compact (Restricted)	2,600 cy	\$33 /cy	\$85,800	Means
Jute Mat	4,200 sy	\$1.64 /sy	\$6,900	Means
Re-Vegetation (forested)	0.9 ac	\$41,000 /ac	\$36,900	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Temporary Irrigation System Installation	0.9 ac	\$6,560 /ac	\$6,000	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	\$650 /month	\$5,900	Irrigate 1"/week, City of Portland water rates, assumes water available
Overhead, bonding, insurance	1 LS	\$200,980 /each	\$201,000	Assume 10% of construction - professional judgment
			Construction Subtotal	\$2,211,000
Oversight and Reporting				
Construction Management	50 day	\$500 /day	\$25,000	Professional judgment
Engineering Oversight	45 day	\$1,500 /day	\$67,500	Assume 15 cy trucks, 10 minutes per truck, 8 hour days, plus prep
Report	1 LS	\$20,000 /each	\$20,000	Professional judgment
Agency Oversight (DEQ/EPA)	20 %	\$217,500 /each	\$43,500	Assumed 20% of engineering costs
			Oversight and Reporting Subtotal	\$156,000
Long-Term (Net Present Value)				
Plant Inspection and Replacement/Control (Yr 1-5)	5 yr	\$20,000 /yr	\$93,000	Professional judgment
Agency Oversight (DEQ/EPA)	10 %	\$93,000 /each	\$9,300	Assumed 10% of engineering costs
			Long-Term Subtotal (Net Present Value)	\$102,000
Contingency				
Contingency	0 %	\$2,724,000	\$0	
Total				
Total \$2,730,000				

Notes:

1) Means - 2014 RS Means Online Cost Estimating

Table 5

Comparative Evaluation of Alternatives

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Release Area Alternative	Protective	Balancing Factors												Score	Rank						
		Effectiveness				Long-Term Reliability				Implementability		Implementation Risk		Reasonableness of Cost							
A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D		
A) No Action	No	-	-	-	-	-	-	-	+	+	+	-	+	+	+	+	+	+	+	3	na
B) Cap	Yes	+	-	-	-	-	-	-	0	0	-	-	+	+	-	-	-	-	-	-1	1
C) Focused Removal and Cap	Yes	+	+	-	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-1	1
D) Removal	Yes	+	+	+	-	-	-	-	0	0	-	-	-	-	-	-	-	-	-	-1	1

Notes:

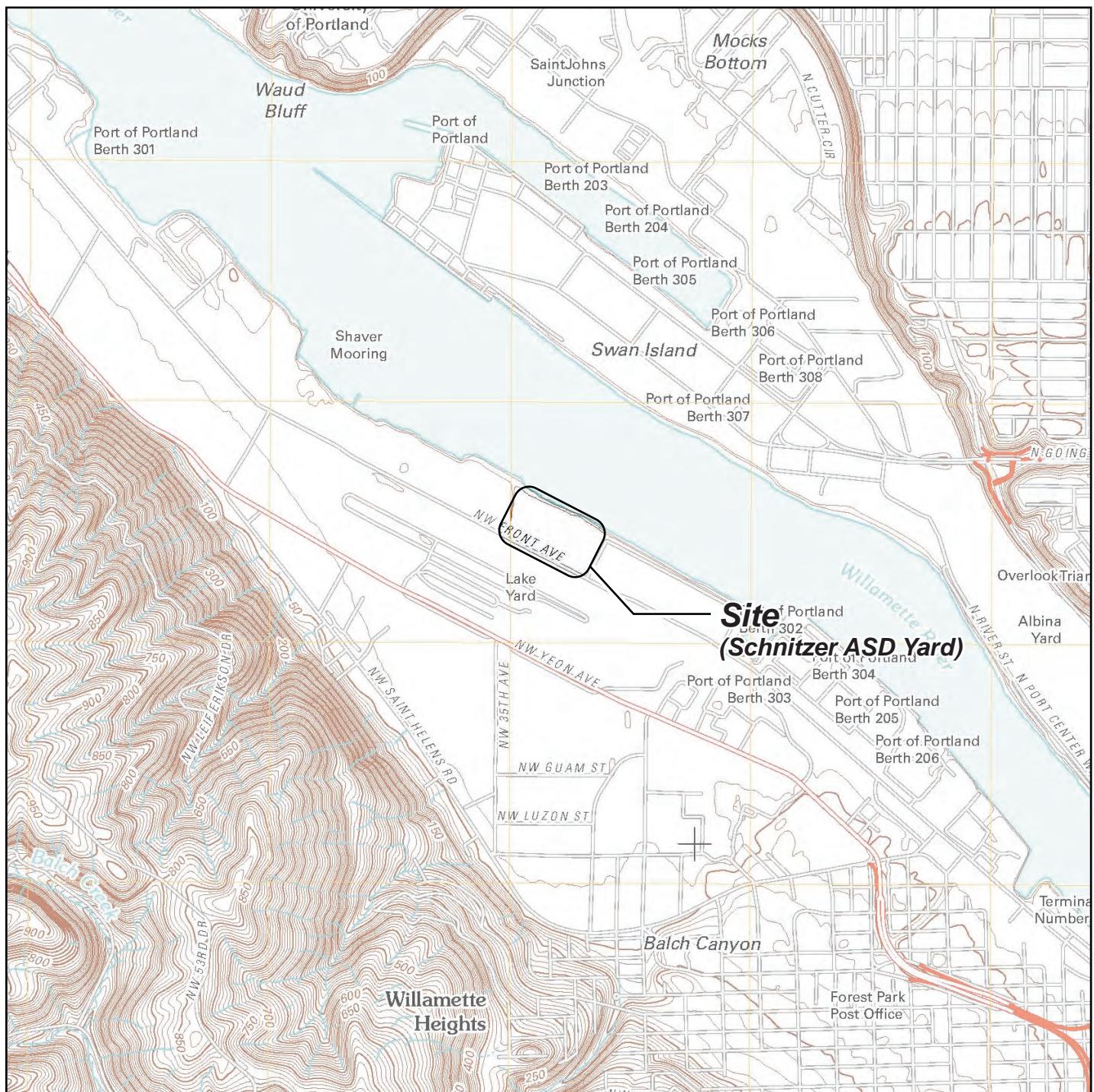
+ = The alternative is favored over the compared alternative (score=1)

0 = The alternative is equal with the compared alternative (score=0)

- = The alternative is less favorable than the compared alternative (score=-1)

na = Not protective, therefore not ranked

	B	C	D
Technology A	■		
Technology B	A	■	
Technology C	A	B	■
Technology D	A	B	■



Note: Base map prepared from USGS 7.5-minute quadrangle of Portland, OR, dated 2011 as provided by USGS.gov.

0 2,000 4,000

Approximate Scale in Feet



Site Location Map

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

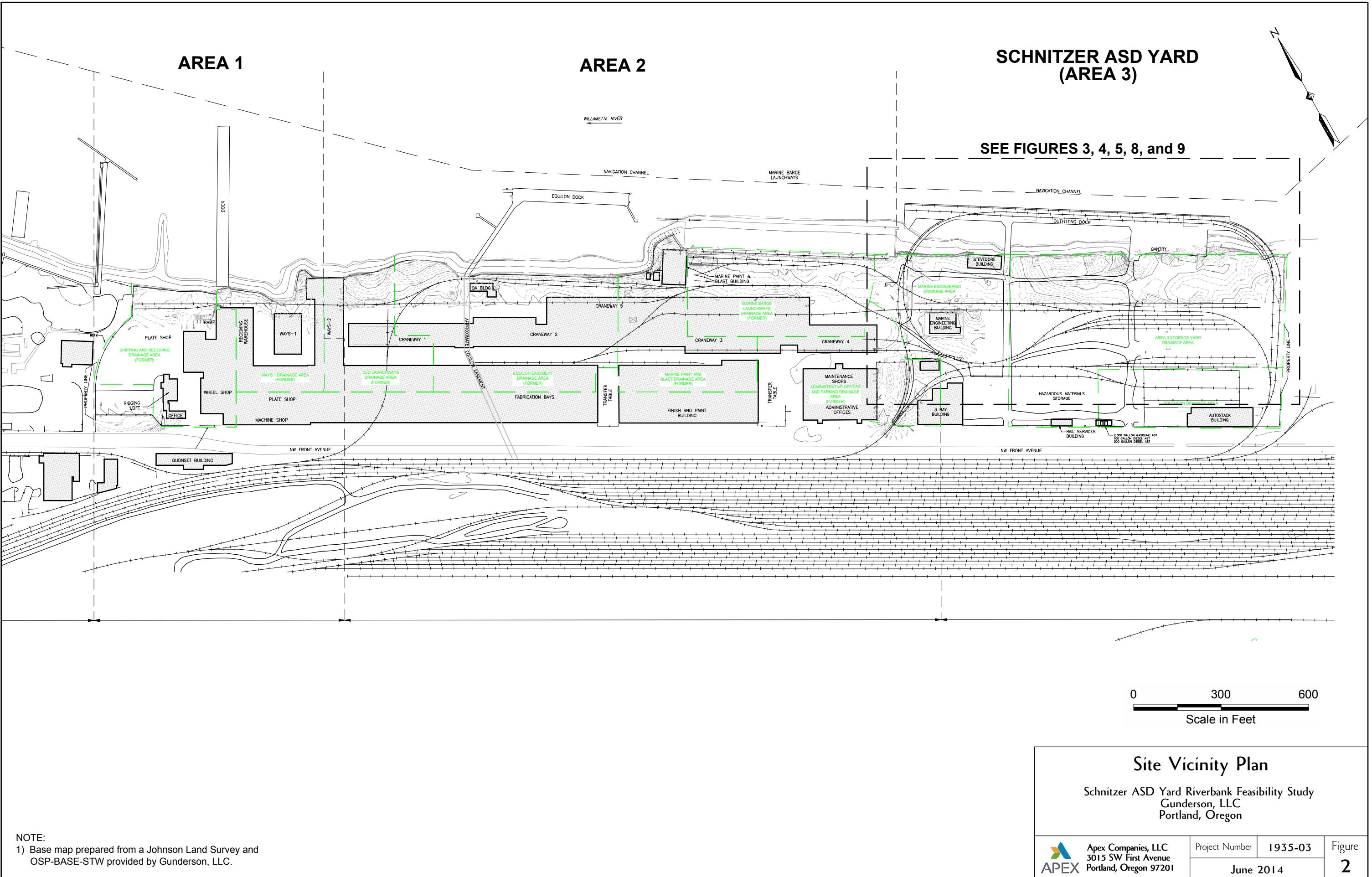


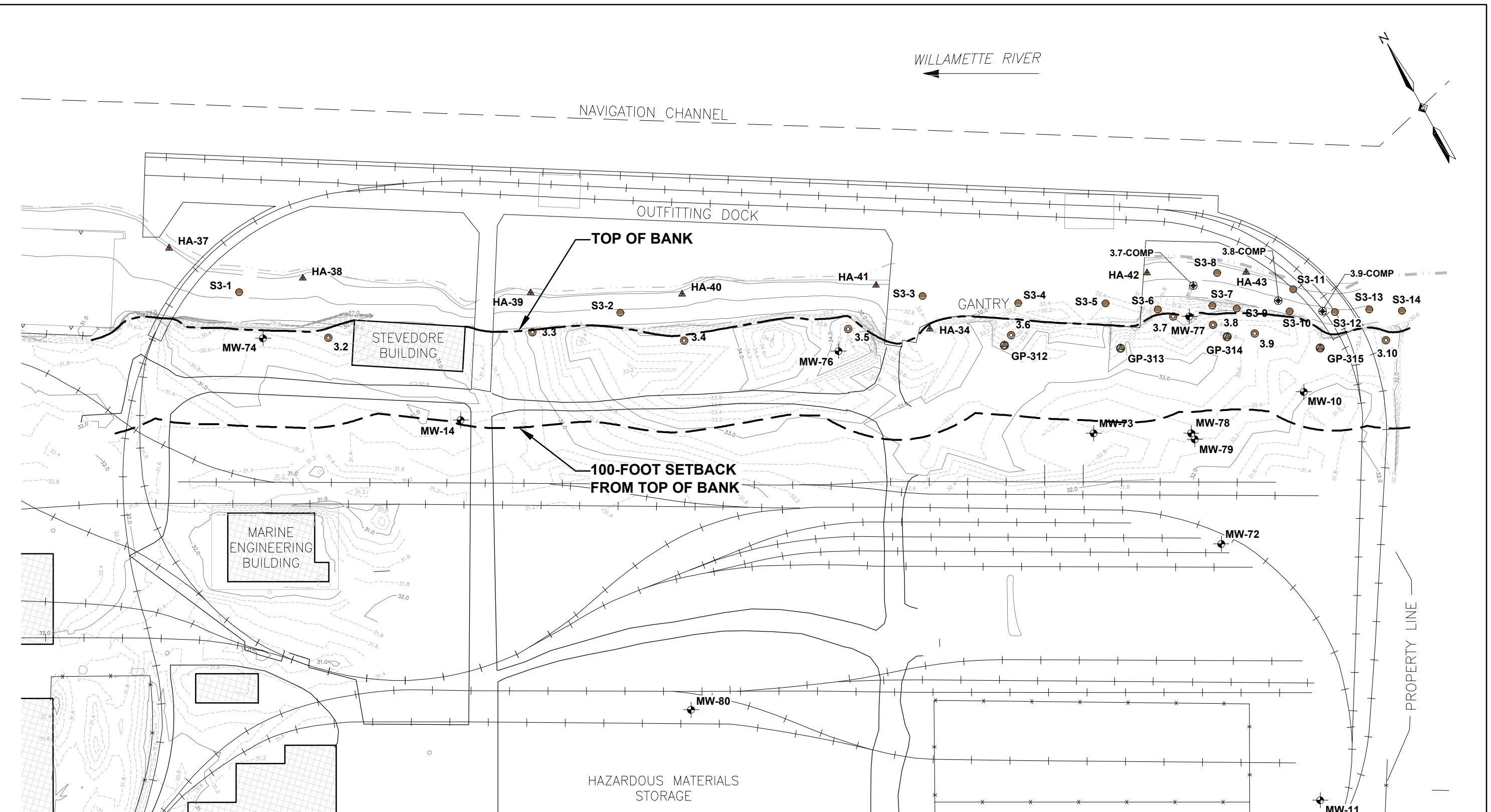
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number I935-03

June 2014

Figure
I





Legend:

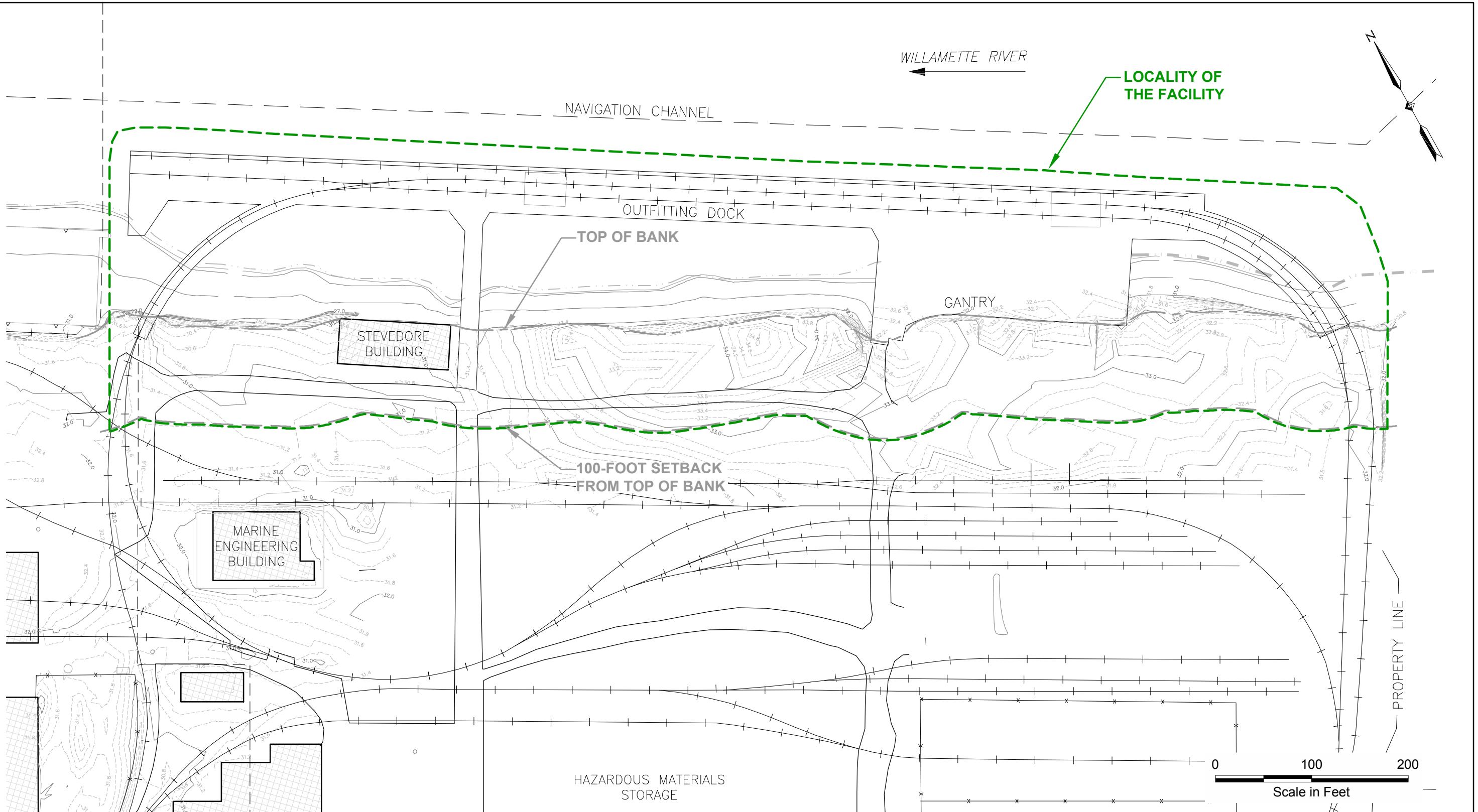
- MW-74 • Monitoring Well Location
- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP ● Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location

NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.

Sample Location Map

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

Locality of the Facility

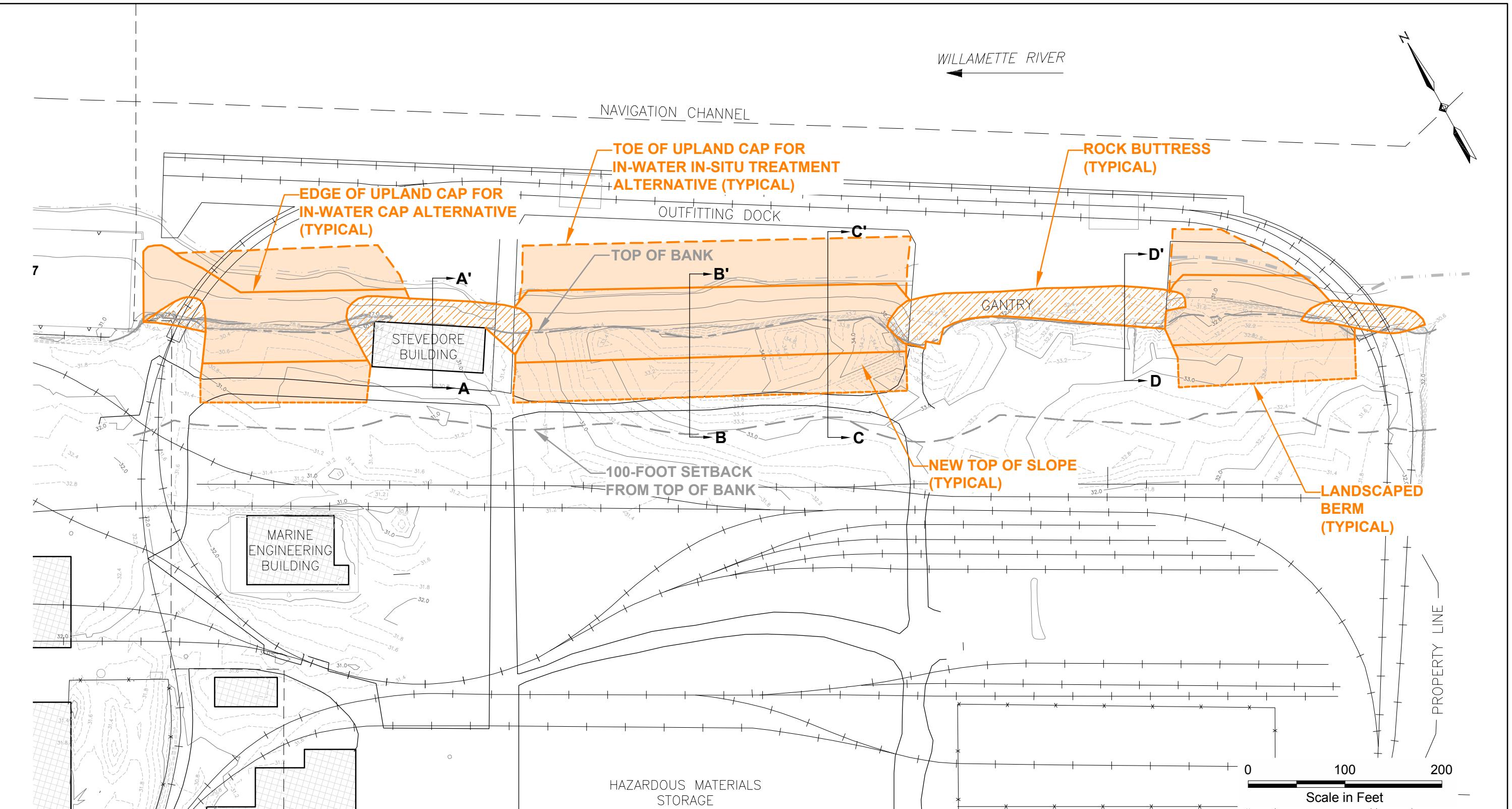
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
		4

June 2014



Legend:

A A'

Cross-Section Location (See Figure 6)

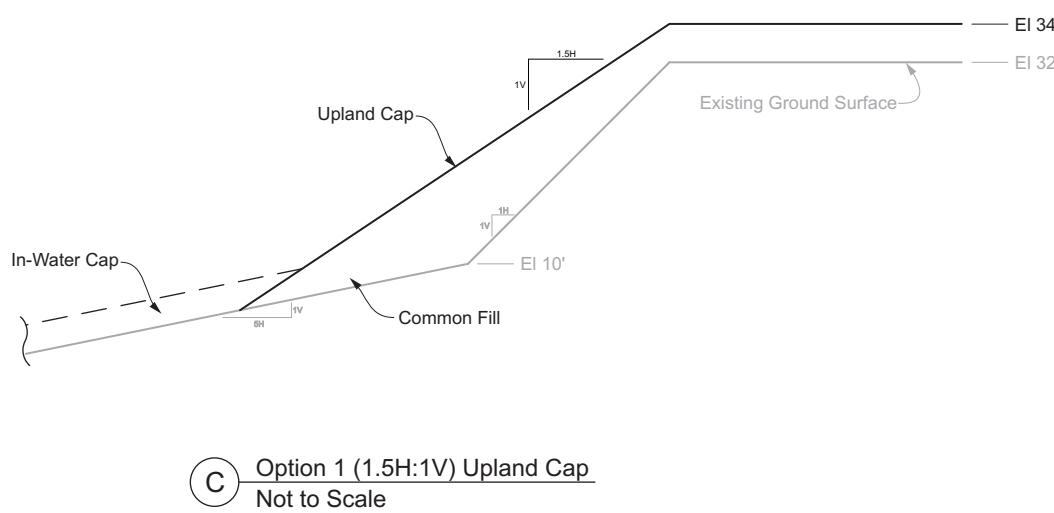
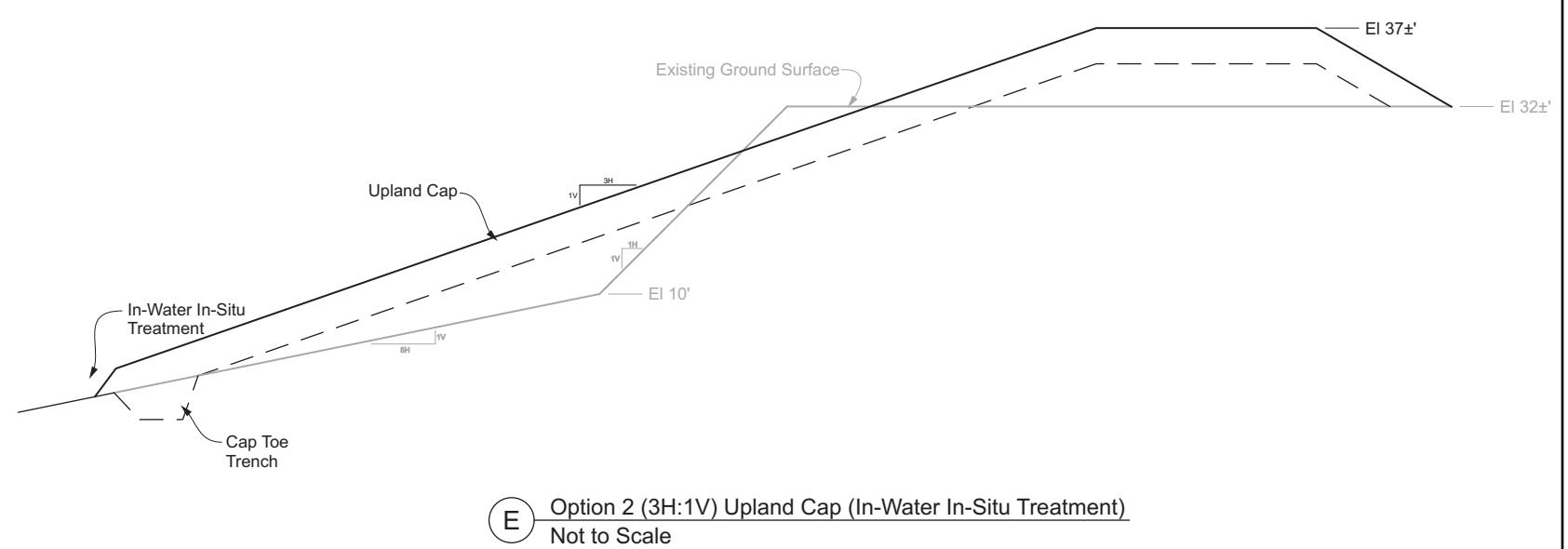
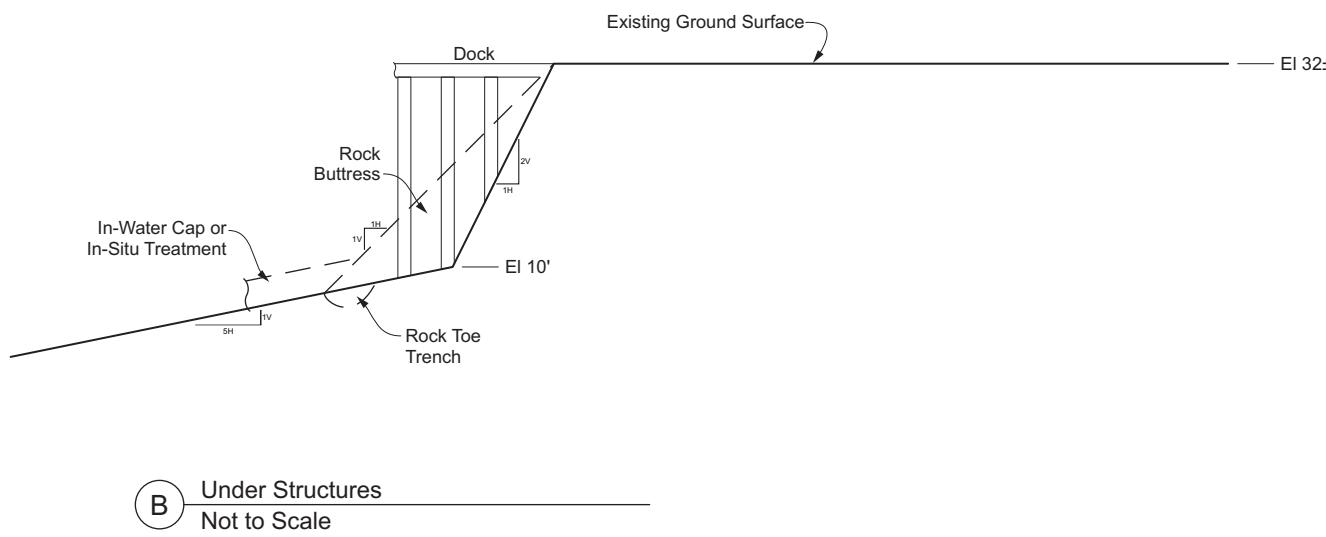
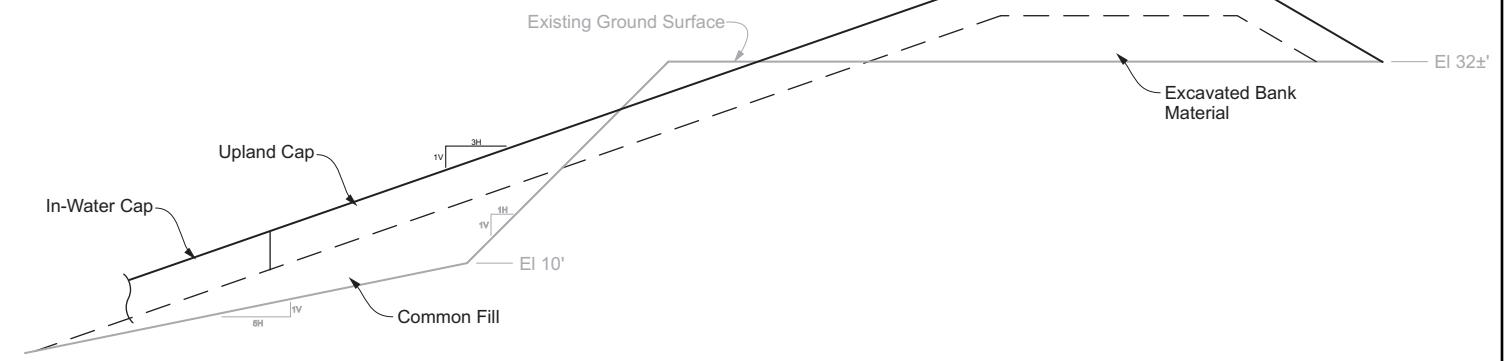
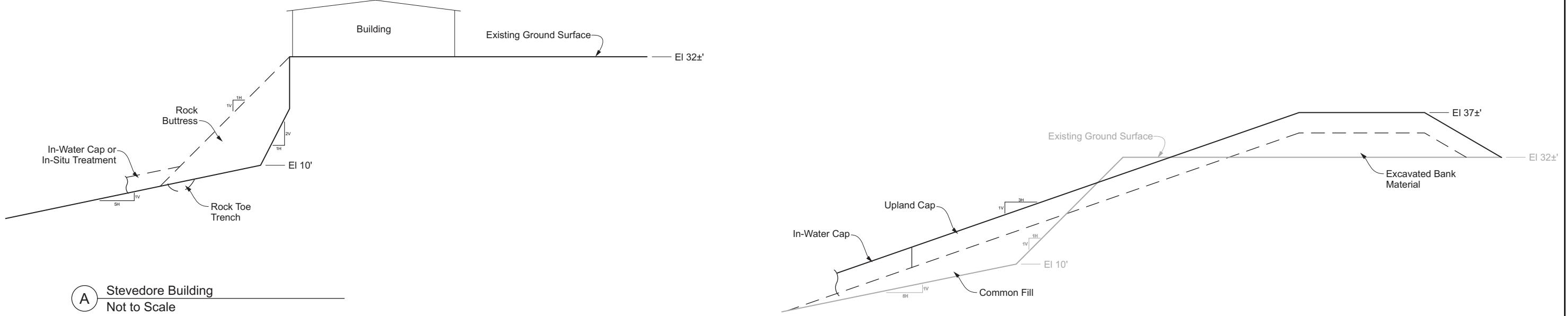
Remedial Action Plan - Cap

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

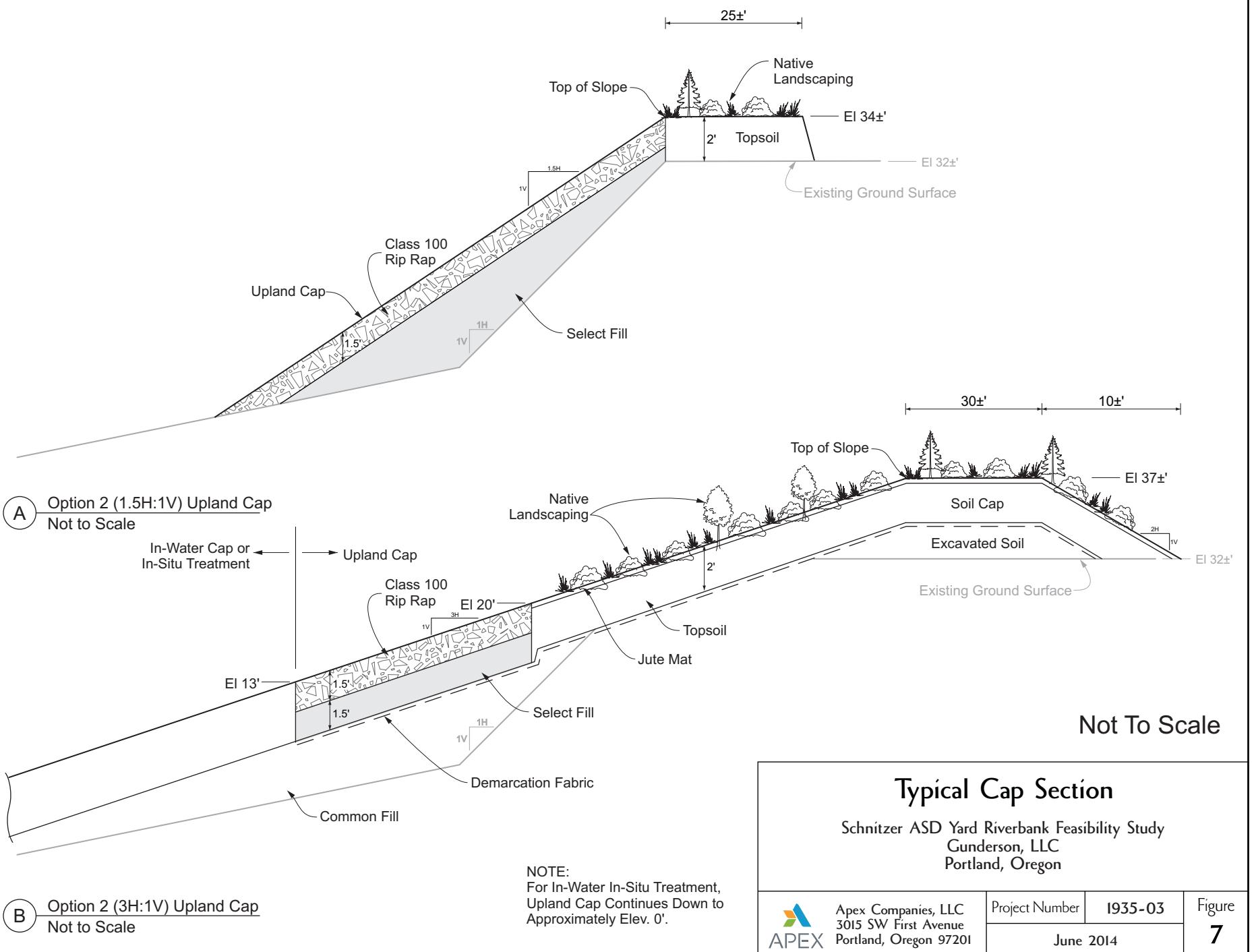
Project Number	1935-03	Figure
June 2014		5

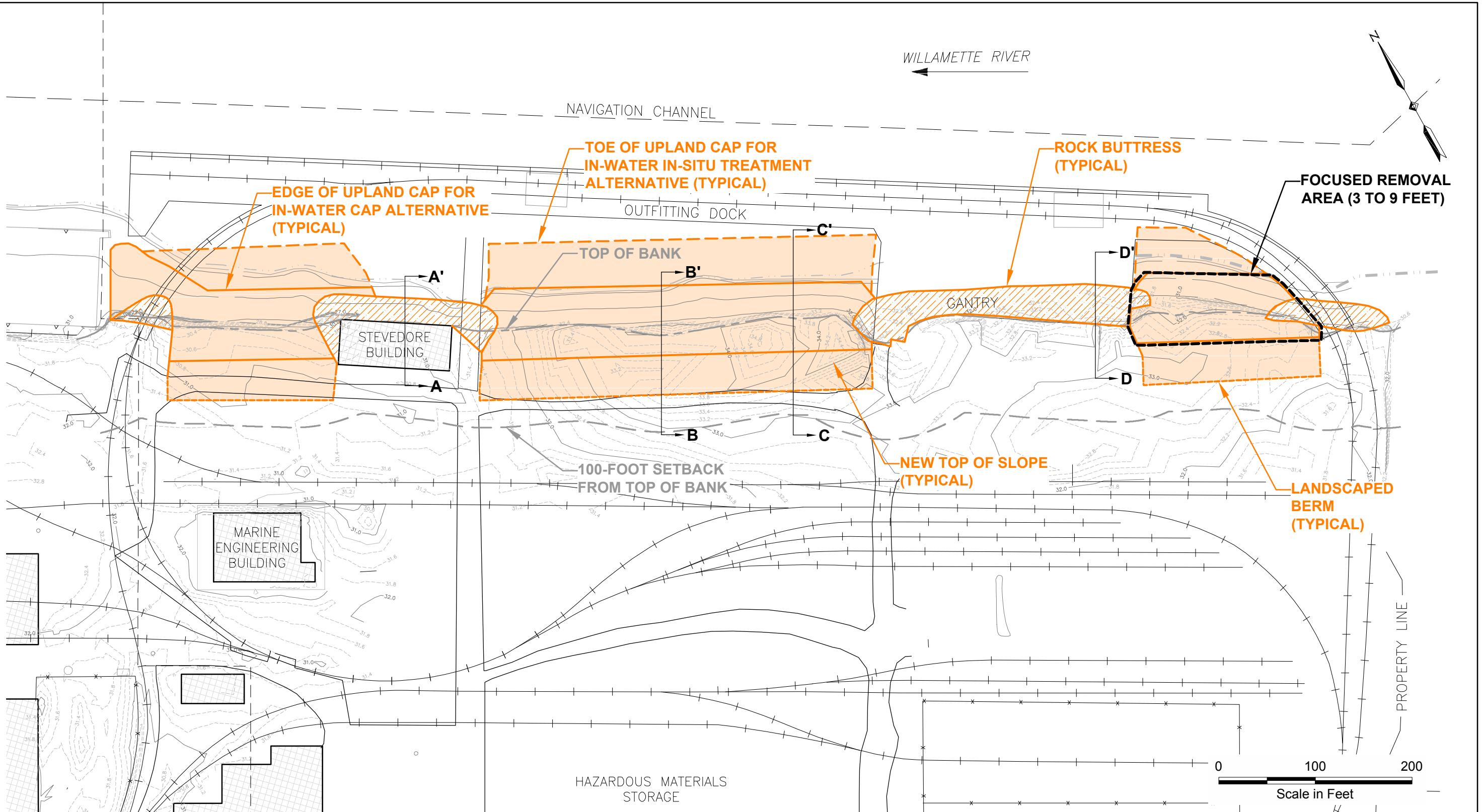


Representative Cross Sections – Cap Alternatives

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX	Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	I935-03	Figure
			June 2014	6





Legend:

A A'

Cross-Section Location (See Figure 6)

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

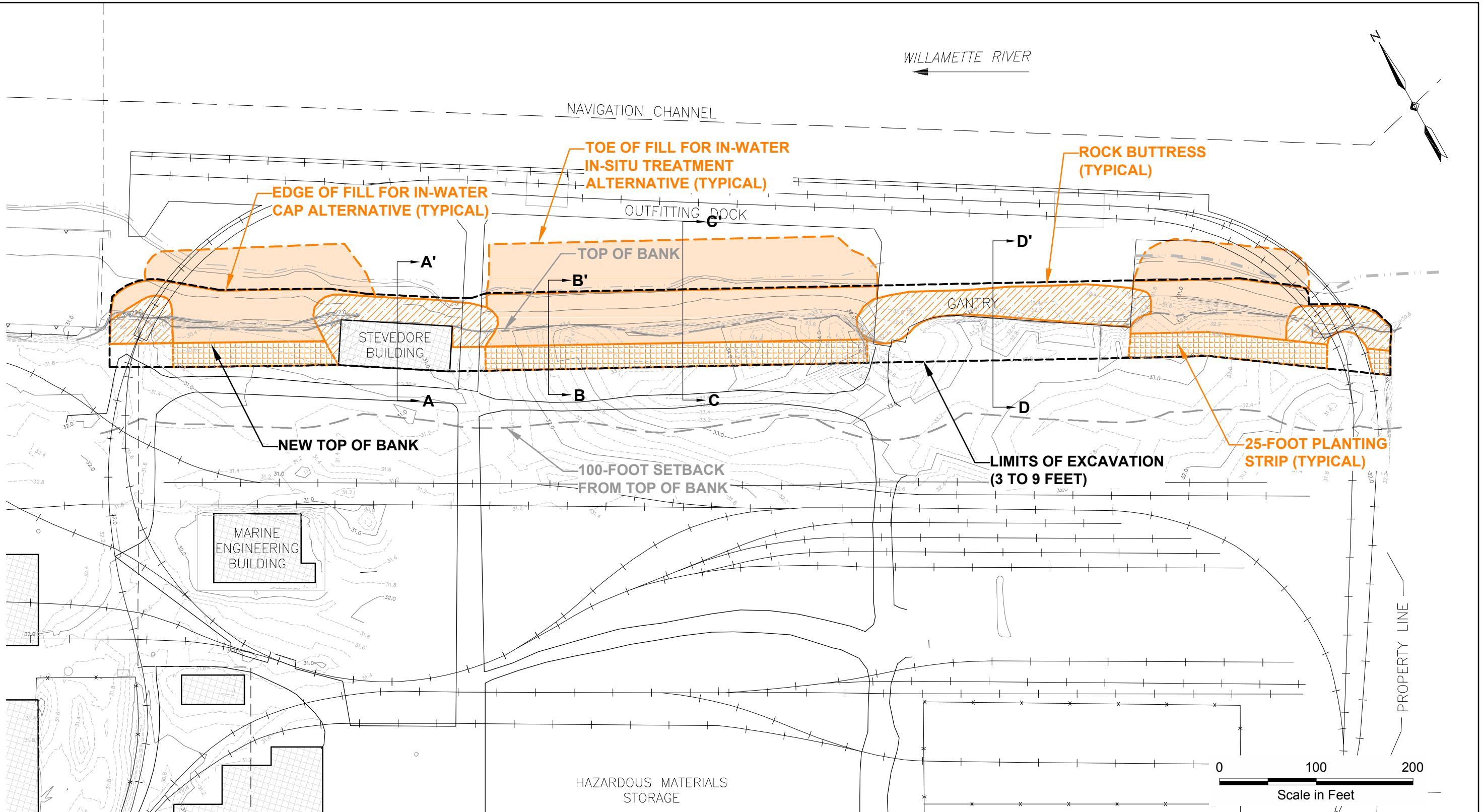
**Remedial Action Plan -
Focused Removal and Cap**
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



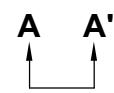
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1935-03
June 2014

Figure 8



Legend:



Cross-Section Location (See Figure 10)

NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

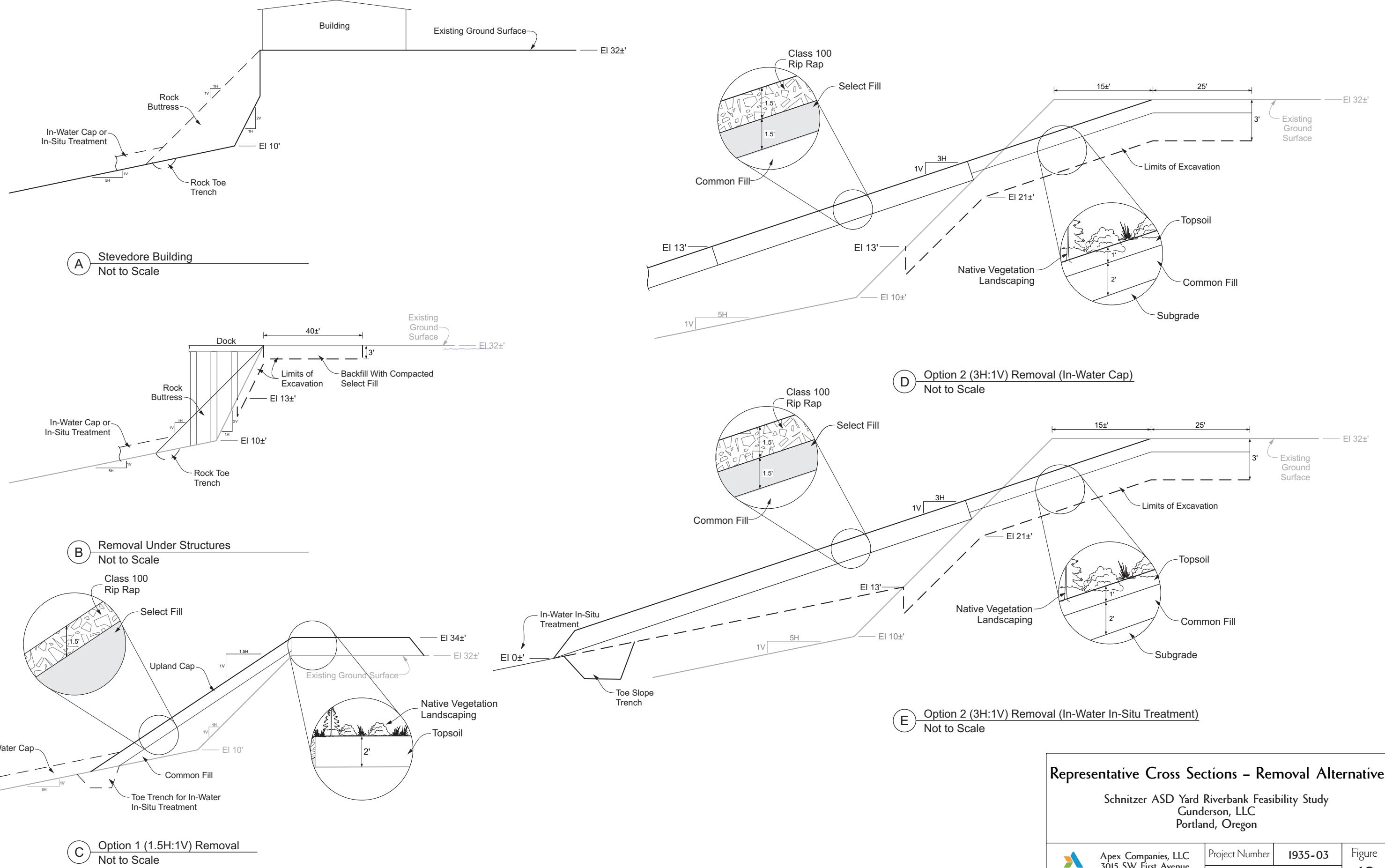
Remedial Action Plan - Removal

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		9



Appendix A

Data Tables and COPC Screening

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Primary Screening Level	
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010			
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.413		0.317		0.0133	J	0.0616	J	0.0449	J	1.18		0.07	
	Arsenic	mg/kg	EPA 6020	143	J	14.1		12.7		11.8		12.7		27.4		3	
	Barium	mg/kg	EPA 6020	246		273		391		218		216		281		790	
	Chromium	mg/kg	EPA 6020	407		82.3		31.6		29.6		26.6		183		76	
	Copper	mg/kg	EPA 6020	568		123		37.3		34.2		32.1		587		50	
	Lead	mg/kg	EPA 6020	898		224		895		27.8		27.4		738		17	
	Manganese	mg/kg	EPA 6020	915		670		543		819		969		1650		1,100	
	Nickel	mg/kg	EPA 6020	228		51		24.4		26.0		26.0		176		36	
	Selenium	mg/kg	EPA 6020	0.398	J	0.266	J	0.488	J	0.0627	J	0.0131	U	0.362	J	0.71	
	Silver	mg/kg	EPA 6020	2.83		0.357	J	4.09		0.220	J	0.262	J	0.795		2	
	Zinc	mg/kg	EPA 6020	2700		320		488		115		98.9		1520		180	
	Antimony	mg/kg	--	--		--		--		--		--		--		5	
	Beryllium	mg/kg	--	--		--		--		--		--		--		10	
	Cadmium	mg/kg	--	--		--		--		--		--		--		1	
	Thallium	mg/kg	--	--		--		--		--		--		--		5	

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100610-3-3.6-25-06 DUP	100710-3-3.7-Surface -11FS	Primary Screening Level					
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/6/2010	10/7/2010					
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	20 - 25	0					
				Result	Flag	Result	Flag	Result	Flag	Result					
Inorganics	Mercury	mg/kg	EPA 7471A	0.175	J	0.176		0.102		0.0262	J	0.0770	J	5.71	0.07
	Arsenic	mg/kg	EPA 6020	9.40		4.37		8.42		2.37	J	2.41	J	29.1	3
	Barium	mg/kg	EPA 6020	202	J	149		218		68.6		113		458	790
	Chromium	mg/kg	EPA 6020	220	J	446		38.2		16.5		18.9		279	76
	Copper	mg/kg	EPA 6020	109	J	53.1		100		16.3		18.4		1840	50
	Lead	mg/kg	EPA 6020	772		267		416		3.92		4.87	J	1780	17
	Manganese	mg/kg	EPA 6020	2110		2850		527		267		248		1940	1,100
	Nickel	mg/kg	EPA 6020	92		263		38.1		19.5		22.1		447	36
	Selenium	mg/kg	EPA 6020	5.76		2.29		0.239	J	0.0109	U	0.0117	U	0.697	0.71
	Silver	mg/kg	EPA 6020	0.766		0.630		0.311	J	0.0544	J	0.0587	J	5.45	2
	Zinc	mg/kg	EPA 6020	473		212		513		52.6		58.6		5510	180
	Antimony	mg/kg	--	--		--		--		--		--		--	5
	Beryllium	mg/kg	--	--		--		--		--		--		--	10
	Cadmium	mg/kg	--	--		--		--		--		--		--	1
	Thallium	mg/kg	--	--		--		--		--		--		--	5

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	Primary Screening Level						
				Sample Date	10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5							
				Result	Flag	Result	Flag	Result	Flag							
Inorganics	Mercury	mg/kg	EPA 7471A	1.92	J	1.82		0.963		1.27		3.24		0.0502	J	0.07
	Arsenic	mg/kg	EPA 6020	7.95		21.3		18.5		19.3		18.5		6.61		3
	Barium	mg/kg	EPA 6020	118		343		292		188		328		206		790
	Chromium	mg/kg	EPA 6020	69.1		132		193		185		281		61.5		76
	Copper	mg/kg	EPA 6020	500		13300		536		724		1740		120		50
	Lead	mg/kg	EPA 6020	331		1860		2430		617		988		187		17
	Manganese	mg/kg	EPA 6020	518		1150		1450		1640		2970		1320		1,100
	Nickel	mg/kg	EPA 6020	98.2		235		287		192		248		39.6		36
	Selenium	mg/kg	EPA 6020	0.133	J	1.78	J	0.611	J	0.126		1.23		0.107	J	0.71
	Silver	mg/kg	EPA 6020	0.374	J	3.22		0.750	J	0.680		4.89		0.240	J	2
	Zinc	mg/kg	EPA 6020	463		4800		1890		1440		1810		617		180
	Antimony	mg/kg	--	--		--		--		--		--		--		5
	Beryllium	mg/kg	--	--		--		--		--		--		--		10
	Cadmium	mg/kg	--	--		--		--		--		--		--		1
	Thallium	mg/kg	--	--		--		--		--		--		--		5

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-5-01-FS		100710-3-3.10-10-02-FS		Primary Screening Level
				Sample Date	10/7/2010	Depth (Feet Below Ground Surface)	0 - 5	
						Result	Flag	
Inorganics	Mercury	mg/kg	EPA 7471A	0.115	J	0.393		0.07
	Arsenic	mg/kg	EPA 6020	3.34		2.87		3
	Barium	mg/kg	EPA 6020	95.5		97.0		790
	Chromium	mg/kg	EPA 6020	19.3		18.8		76
	Copper	mg/kg	EPA 6020	31.9		20.3		50
	Lead	mg/kg	EPA 6020	26.8		8.93		17
	Manganese	mg/kg	EPA 6020	340		289		1,100
	Nickel	mg/kg	EPA 6020	17.4		19.6		36
	Selenium	mg/kg	EPA 6020	0.296	J	0.0113	U	0.71
	Silver	mg/kg	EPA 6020	0.196	J	0.141	J	2
	Zinc	mg/kg	EPA 6020	80.7		59.8		180
	Antimony	mg/kg	--	--		--		5
	Beryllium	mg/kg	--	--		--		10
	Cadmium	mg/kg	--	--		--		1
	Thallium	mg/kg	--	--		--		5

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level			
				Sample Date		12/19/2003	12/19/2003	12/19/2003	12/19/2003		12/19/2003				
				Depth (Feet Below Ground Surface)		0.5	2.5	2.5 DUP	0.5		1.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.189		0.089		ND	U	0.308		0.265			
	Arsenic	mg/kg	EPA 6020	28.8		7.37		3.74		43.2		43.3			
	Barium	mg/kg	EPA 6020	364		115		57.3		260		201			
	Chromium	mg/kg	EPA 6020	47.6		102		31.7		119		80.5			
	Copper	mg/kg	EPA 6020	264		67.8		37.3		768		637			
	Lead	mg/kg	EPA 6020	561		114		99.9		673		398			
	Manganese	mg/kg	EPA 6020	1,430		833		698		1,440		1,330			
	Nickel	mg/kg	EPA 6020	74.1		111		150		244		126			
	Selenium	mg/kg	EPA 6020	0.505		ND	U	ND	U	0.636		0.506			
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	0.518		0.529			
	Zinc	mg/kg	EPA 6020	1,010		234		175		1,380		1,190			
	Antimony	mg/kg	EPA 602	9.87		1.46		0.931		21.9		10.1			
	Beryllium	mg/kg	EPA 602	ND	U	ND	U	ND	U	ND	U	0.343			
	Cadmium	mg/kg	EPA 602	0.458		ND	U	ND	U	1.17		0.895			
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	ND	U	ND			

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level				
				Sample Date		12/18/2003		12/18/2003		12/18/2003						
				0.5		2		0.5		2						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Inorganics	Mercury	mg/kg	EPA 7471A	0.694		1		0.26		0.122		0.07				
	Arsenic	mg/kg	EPA 6020	6.35		8.22		8.42		3.61		3				
	Barium	mg/kg	EPA 6020	160		196		157		97.4		790				
	Chromium	mg/kg	EPA 6020	89.8		67.4		49.2		21.2		76				
	Copper	mg/kg	EPA 6020	174		275		87.0		42.3		50				
	Lead	mg/kg	EPA 6020	406		437		816		109		17				
	Manganese	mg/kg	EPA 6020	1,000		873		1,020		297		1,100				
	Nickel	mg/kg	EPA 6020	93.2		99.1		44.0		28.9		36				
	Selenium	mg/kg	EPA 6020	ND	U	0.502		0.448		ND	U	0.71				
	Silver	mg/kg	EPA 6020	ND	U	0.522		ND		ND	U	2				
	Zinc	mg/kg	EPA 6020	1,560		1,000		530		152		180				
	Antimony	mg/kg	EPA 602	4.92		7.82		3.53		0.494		5				
	Beryllium	mg/kg	EPA 602	0.432		0.471		0.756		0.401		10				
	Cadmium	mg/kg	EPA 602	ND	U	1.29		ND	U	ND	U	1				
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	ND	U	5				

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level			
				Sample Date	12/17/2003	12/17/2003	12/16/2003				
				Depth (Feet Below Ground Surface)	0.5	2.5	2				
				Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.307		0.427		0.07			
	Arsenic	mg/kg	EPA 6020	4.68		2.35		3			
	Barium	mg/kg	EPA 6020	188		181		790			
	Chromium	mg/kg	EPA 6020	35.3		21.1		76			
	Copper	mg/kg	EPA 6020	126		25.9		50			
	Lead	mg/kg	EPA 6020	242		13.7		17			
	Manganese	mg/kg	EPA 6020	310		303		1,100			
	Nickel	mg/kg	EPA 6020	43.6		24.1		36			
	Selenium	mg/kg	EPA 6020	0.893	U	ND	U	0.71			
	Silver	mg/kg	EPA 6020	ND		ND		2			
	Zinc	mg/kg	EPA 6020	564		83.6		180			
	Antimony	mg/kg	EPA 602	2.24		ND	U	5			
	Beryllium	mg/kg	EPA 602	0.447		ND	U	10			
	Cadmium	mg/kg	EPA 602	0.857		ND	U	1			
	Thallium	mg/kg	EPA 602	ND	U	ND	U	5			

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004		2/24/2004						
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Inorganics	Mercury	mg/kg	EPA 7471A	0.483		4.57		0.99		10.6		0.07				
	Arsenic	mg/kg	EPA 6020	19.4		40.7		24.4		27		3				
	Barium	mg/kg	EPA 6020	165		637		243		613		790				
	Chromium	mg/kg	EPA 6020	142		464		194		259		76				
	Copper	mg/kg	EPA 6020	333		1,990		1,370		1,760		50				
	Lead	mg/kg	EPA 6020	591		2,650		1,030		2,950		17				
	Manganese	mg/kg	EPA 6020	629		1,860		2,220		2,330		1,100				
	Nickel	mg/kg	EPA 6020	174		627		341		309		36				
	Selenium	mg/kg	EPA 6020	0.878		0.831		ND	U	1.05		0.71				
	Silver	mg/kg	EPA 6020	ND	U	2.09		0.781		1.93		2				
	Zinc	mg/kg	EPA 6020	1,290		9,000		4,220		5,020		180				
	Antimony	mg/kg	EPA 602	7.44		47		18		55.1		5				
	Beryllium	mg/kg	EPA 602	ND	U	ND	U	ND	U	ND	U	10				
	Cadmium	mg/kg	EPA 602	6.29		26.7		9.3		18.7		1				
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	ND	U	5				

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level			
			Sample Date	12/22/2003		12/22/2003		12/22/2003					
			Depth (Feet Below Ground Surface)	0.5	2.5		5						
				Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.466		0.161		ND		0.07			
	Arsenic	mg/kg	EPA 6020	3.51		1.72		5.74		3			
	Barium	mg/kg	EPA 6020	140		104		135		790			
	Chromium	mg/kg	EPA 6020	30.9		16.4		18.7		76			
	Copper	mg/kg	EPA 6020	54.8		60		33.7		50			
	Lead	mg/kg	EPA 6020	114		78.3		55.1		17			
	Manganese	mg/kg	EPA 6020	427		390		567		1,100			
	Nickel	mg/kg	EPA 6020	31.3		14.1		21.2		36			
	Selenium	mg/kg	EPA 6020	0.529		ND	U	0.485		0.71			
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2			
	Zinc	mg/kg	EPA 6020	179		127		102		180			
	Antimony	mg/kg	EPA 602	0.872		2.26		1.83		5			
	Beryllium	mg/kg	EPA 602	0.523		0.498		0.645		10			
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	1			
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	5			

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Inorganics	Mercury	mg/kg	EPA 7471A	0.24		ND		0.0686		0.07		
	Arsenic	mg/kg	EPA 6020	5.29		2.44		2.48		3		
	Barium	mg/kg	EPA 6020	165		107		53.3		790		
	Chromium	mg/kg	EPA 6020	154		14.6		141		76		
	Copper	mg/kg	EPA 6020	66.2		46.6		74.2		50		
	Lead	mg/kg	EPA 6020	206		127		21.1		17		
	Manganese	mg/kg	EPA 6020	1,520		398		1,440		1,100		
	Nickel	mg/kg	EPA 6020	252		32.4		159		36		
	Selenium	mg/kg	EPA 6020	1.15		ND	U	0.658		0.71		
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2		
	Zinc	mg/kg	EPA 6020	190		90		65.1		180		
	Antimony	mg/kg	EPA 602	2.15		ND	U	ND	U	5		
	Beryllium	mg/kg	EPA 602	ND	U	ND	U	ND	U	10		
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	1		
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	5		

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level		
				Sample Date		2/24/2004		2/24/2004		2/24/2004		
				Depth (Feet Below Ground Surface)				0.5		2.5		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Inorganics	Mercury	mg/kg	EPA 7471A	ND	U	2.08		0.208				0.07
	Arsenic	mg/kg	EPA 6020	15.3		20.2		4.17				3
	Barium	mg/kg	EPA 6020	192		210		67.3				790
	Chromium	mg/kg	EPA 6020	24.5		158		153				76
	Copper	mg/kg	EPA 6020	32.7		612		89				50
	Lead	mg/kg	EPA 6020	105		689		76.8				17
	Manganese	mg/kg	EPA 6020	1,070		1,710		2,720				1,100
	Nickel	mg/kg	EPA 6020	20.1		188		385				36
	Selenium	mg/kg	EPA 6020	ND	U	1.79		1.3				0.71
	Silver	mg/kg	EPA 6020	ND	U	2.22		ND		U		2
	Zinc	mg/kg	EPA 6020	138		2,100		130				180
	Antimony	mg/kg	EPA 602	ND	U	14.5		ND		U		5
	Beryllium	mg/kg	EPA 602	0.754		ND		ND		U		10
	Cadmium	mg/kg	EPA 602	ND	U	4.69		ND		U		1
	Thallium	mg/kg	EPA 602	ND	U	ND		ND		U		5

Please refer to notes at end of table.

Table A-1

Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level				
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
Inorganics	Mercury	mg/kg	EPA 7471A	0.19		ND	U	ND	U	0.07				
	Arsenic	mg/kg	EPA 6020	1.04		1.16		1.87		3				
	Barium	mg/kg	EPA 6020	122		86.7		93.4		790				
	Chromium	mg/kg	EPA 6020	9.79		11.6		13.1		76				
	Copper	mg/kg	EPA 6020	30.5		18.9		16.9		50				
	Lead	mg/kg	EPA 6020	22.1		7.17		5.4		17				
	Manganese	mg/kg	EPA 6020	853		292		233		1,100				
	Nickel	mg/kg	EPA 6020	8.89		15.7		17.9		36				
	Selenium	mg/kg	EPA 6020	ND	U	ND	U	ND	U	0.71				
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2				
	Zinc	mg/kg	EPA 6020	81.8		54		52.7		180				
	Antimony	mg/kg	EPA 602	ND	U	ND	U	ND	U	5				
	Beryllium	mg/kg	EPA 602	0.483		ND	U	ND	U	10				
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	1				
	Thallium	mg/kg	EPA 602	ND	U	ND	U	ND	U	5				

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level

7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-2

Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Primary Screening Level
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Inorganics	Mercury	mg/kg	EPA 7471A	2.64		1.93		2.41		2.13		0.226		4.02		0.07
	Arsenic	mg/kg	EPA 6020	11.1		48.2		32.1		25.3		9.60		61.4		3
	Barium	mg/kg	EPA 6020	205		324		324		554		164		985		790
	Chromium	mg/kg	EPA 6020	64.8		142		170		147		112		918		76
	Copper	mg/kg	EPA 6020	268		892		872		142		88.9		2340		50
	Lead	mg/kg	EPA 6020	518		1550		3200		3700		611		2990		17
	Manganese	mg/kg	EPA 6020	811		1810		1840		1250		4310		3290		1,100
	Nickel	mg/kg	EPA 6020	63.8	J	164		117		75.3		70.5		1590		36
	Selenium	mg/kg	EPA 6020	0.205	J	0.732	J	0.978	J	0.207	J	0.199	J	0.971		0.71
	Silver	mg/kg	EPA 6020	0.381	J	1.260	J	0.555	J	0.518	J	0.227	J	2.26		2
	Zinc	mg/kg	EPA 6020	1000		7540		3740		1940		479		8820		180

Please refer to notes at end of table.

Table A-2

Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
Inorganics	Mercury	mg/kg	EPA 7471A	18.9		2.73		2.89		1.94		3.20		0.0907	J	0.07	
	Arsenic	mg/kg	EPA 6020	68.9		55.9		26.7		24.2		24.4		2.93		3	
	Barium	mg/kg	EPA 6020	788		214		561		449		328		111		790	
	Chromium	mg/kg	EPA 6020	569		353		284		222		249		23.5		76	
	Copper	mg/kg	EPA 6020	1740		2270		1710		1230		1170		24.3		50	
	Lead	mg/kg	EPA 6020	4160		2550		2160		1390		1500		11.3		17	
	Manganese	mg/kg	EPA 6020	2820		3170		1610		2220		2230		346		1,100	
	Nickel	mg/kg	EPA 6020	1040		356		388		241		251		23.3		36	
	Selenium	mg/kg	EPA 6020	0.642		28.1		0.563		0.398		0.0938		0.0564	J	0.71	
	Silver	mg/kg	EPA 6020	2.36		1.96		1.72		1.45		0.844		0.169	J	2	
	Zinc	mg/kg	EPA 6020	7110		7960		9470		4640		3380		83.8		180	

Please refer to notes at end of table.

Table A-2

Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Primary Screening Level
				Sample Date		10/15/2010	10/15/2010	
				Result	Flag	Result	Flag	
Inorganics	Mercury	mg/kg	EPA 7471A	0.279		0.361		0.07
	Arsenic	mg/kg	EPA 6020	5.74		4.55		3
	Barium	mg/kg	EPA 6020	154		140		790
	Chromium	mg/kg	EPA 6020	30.6		27.8		76
	Copper	mg/kg	EPA 6020	43.9		34.3		50
	Lead	mg/kg	EPA 6020	114		22.7		17
	Manganese	mg/kg	EPA 6020	540		487		1,100
	Nickel	mg/kg	EPA 6020	29.3		26.5		36
	Selenium	mg/kg	EPA 6020	0.0119	U	0.0316	J	0.71
	Silver	mg/kg	EPA 6020	0.327	J	0.379	J	2
	Zinc	mg/kg	EPA 6020	200		112		180

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level

7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-3

Composite Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Primary Screening Level
				Composite-07-FS	Composite-11-FS	Composite-14-FS	
				Sample Date	10/15/2010	10/15/2010	10/15/2010
Inorganics	Mercury	mg/kg	EPA 7471A	8.38	3.36	3.21	0.07
	Arsenic	mg/kg	EPA 6020	37.9	25.7	28.5	3
	Barium	mg/kg	EPA 6020	758	462	415	790
	Chromium	mg/kg	EPA 6020	282	252	358	76
	Copper	mg/kg	EPA 6020	2010	893	941	50
	Lead	mg/kg	EPA 6020	2610	1980	2660	17
	Manganese	mg/kg	EPA 6020	2060	1650	2240	1,100
	Nickel	mg/kg	EPA 6020	507	255	342	36
	Selenium	mg/kg	EPA 6020	1.32	J	0.436	0.71
	Silver	mg/kg	EPA 6020	2.52	J	1.28	2
	Zinc	mg/kg	EPA 6020	7670	4270	4380	180

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level

7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Primary Screening Level	
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010			
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PCBs	Aroclor 1016	µg/kg	EPA 8082	97.1	U	4.02	U	4.16	U	2.15	U	2.24	U	197	U	530	
	Aroclor 1221	µg/kg	EPA 8082	194	U	8.01	U	8.29	U	4.29	U	4.47	U	393	U	--	
	Aroclor 1232	µg/kg	EPA 8082	97.1	U	4.02	U	4.16	U	2.15	U	2.24	U	197	U	--	
	Aroclor 1242	µg/kg	EPA 8082	97.1	U	4.02	U	4.16	U	2.15	U	2.24	U	197	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	837		4.02	U	4.16	U	2.15	U	2.24	U	197	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	97.1	U	39.5	J	30.0	J	4.14	J	2.24	U	2360		300	
	Aroclor 1260	µg/kg	EPA 8082	1020		4.02	U	4.16	U	2.15	U	2.24	U	197	U	200	
	Aroclor 1262	µg/kg	EPA 8082	97.1	U	19.6	J	4.16	U	2.15	U	2.24	U	197	U	--	
	Aroclor 1268	µg/kg	EPA 8082	97.1	U	4.02	U	4.16	U	2.15	U	2.24	U	197	U	--	
	Total PCBs	µg/kg	EPA 8082	1857		59.1	J	30.0	J	4.14	J	4.5	U	2360		0.041	

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Primary Screening Level						
				Sample Date	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010						
				Depth (Feet Below Ground Surface)	5 - 10	0 - 5	10 - 15	0	0 - 5	0						
				Result	Flag	Result	Flag	Result	Flag	Result						
				Result	Flag	Result	Flag	Result	Flag	Result						
PCBs	Aroclor 1016	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	530
	Aroclor 1221	µg/kg	EPA8082	20.0	U	18.9	U	3.61	U	1800	U	362	U	1520	U	--
	Aroclor 1232	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	--
	Aroclor 1242	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	1,500
	Aroclor 1248	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	1,500
	Aroclor 1254	µg/kg	EPA 8082	200		121	J	1.81	U	16100		1160		10000		300
	Aroclor 1260	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	200
	Aroclor 1262	µg/kg	EPA8082	10.0	U	93.6	J	1.81	U	904	U	772		764	U	--
	Aroclor 1268	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	--
	Total PCBs	µg/kg	EPA 8082	200		215	J	3.6	U	16100		1932		10000		0.041

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS		100710-3-3.9-Surface-10-FS		100710-3-3.9-5-01-FS		100710-3-3.10-Surface -11-WS		100710-3-3.10-5-01-FS		100710-3-3.10-10-02-FS		Primary Screening Level				
				Sample Date		10/6/2010		10/7/2010		10/7/2010		10/7/2010		10/7/2010						
				Depth (Feet Below Ground Surface)		0 - 5		0		0 - 5		0		0 - 5		5 - 10				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	1.93	U	530				
	Aroclor 1221	µg/kg	EPA8082	744	U	1760	U	749	U	36.1	U	7.84	U	3.85	U	--				
	Aroclor 1232	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	1.93	U	--				
	Aroclor 1242	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	1.93	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	1.93	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	373	U	14600	J	4840		84.6		49.1		1.93	U	300				
	Aroclor 1260	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	2.07	J	200				
	Aroclor 1262	µg/kg	EPA8082	5710	J	882	U	918		18.1	U	10.6		1.93	U	--				
	Aroclor 1268	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	1.93	U	--				
	Total PCBs	µg/kg	EPA 8082	5710		14600	J	5758		84.6		59.7		2.07	J	0.041				

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level			
				Sample Date		12/19/2003	12/19/2003		12/19/2003	12/19/2003					
				Depth (Feet Below Ground Surface)		0.5	2.5		2.5 DUP	0.5		1.5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		--		530			
	Aroclor 1221	µg/kg	EPA 8082	--		--		--		--		--			
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--		--			
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	1,500			
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	1,500			
	Aroclor 1254	µg/kg	EPA 8082	ND	U	380		250		2,350		300			
	Aroclor 1260	µg/kg	EPA 8082	78.9		128		84.6		614		200			
	Aroclor 1262	µg/kg	EPA 8082	--		--		--		--		--			
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--		--			
	Total PCBs	µg/kg	EPA 8082	78.9		508		334.6		2,964		558	0.041		

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level				
				Sample Date		12/18/2003	12/18/2003	12/18/2003		12/18/2003	12/18/2003					
				Depth (Feet Below Ground Surface)		0.5	2	0.5		2	2					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		--		530				
	Aroclor 1221	µg/kg	EPA 8082	--		--		--		--		--				
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--		--				
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	462		1,230		ND	U	ND	U	300				
	Aroclor 1260	µg/kg	EPA 8082	214		411		463		92		200				
	Aroclor 1262	µg/kg	EPA 8082	--		--		--		--		--				
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--		--				
	Total PCBs	µg/kg	EPA 8082	676		1,641		463		92		0.041				

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Primary Screening Level	
				Sample Date		12/17/2003		12/17/2003			
				Depth (Feet Below Ground Surface)		0.5		2.5			
				Result	Flag	Result	Flag	Result	Flag		
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		530	
	Aroclor 1221	µg/kg	EPA 8082	--		--		--		--	
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--	
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	332		ND	U	3,570		300	
	Aroclor 1260	µg/kg	EPA 8082	330		ND	U	ND	U	200	
	Aroclor 1262	µg/kg	EPA 8082	--		--		--		--	
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--	
	Total PCBs	µg/kg	EPA 8082	662		0		3,570		0.041	

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	
				Sample Date		2/24/2004		2/24/2004		2/24/2004			
				Depth (Feet Below Ground Surface)		0.5		2		0.5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		--		530	
	Aroclor 1221	µg/kg	EPA8082	--		--		--		--		--	
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--		--	
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND		ND	U	ND	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND		ND	U	ND	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	281		7,080		5,170		24,900		300	
	Aroclor 1260	µg/kg	EPA 8082	153		3,110		ND	U	6,060		200	
	Aroclor 1262	µg/kg	EPA8082	--		--		--		--		--	
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--		--	
	Total PCBs	µg/kg	EPA 8082	434		10,190		5,170		30,960		0.041	

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level				
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		530				
	Aroclor 1221	µg/kg	EPA8082	--		--		--		--				
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	122		ND	U	ND	U	300				
	Aroclor 1260	µg/kg	EPA 8082	90.7		ND	U	ND	U	200				
	Aroclor 1262	µg/kg	EPA8082	--		--		--		--				
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--				
	Total PCBs	µg/kg	EPA 8082	212.7		--		--		0.041				

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level				
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		530				
	Aroclor 1221	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	300				
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	200				
	Aroclor 1262	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--				
	Total PCBs	µg/kg	EPA 8082	--		--		--		0.041				

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		530				
	Aroclor 1221	µg/kg	EPA8082	--		--		--		--				
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	4,920		6,090		ND	U	300				
	Aroclor 1260	µg/kg	EPA 8082	1,150		1,300		ND	U	200				
	Aroclor 1262	µg/kg	EPA8082	--		--		--		--				
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--				
	Total PCBs	µg/kg	EPA 8082	6,070		7,390		ND	U	0.041				

Please refer to notes at end of table.

Table A-4

Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level				
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
PCBs	Aroclor 1016	µg/kg	EPA 8082	--		--		--		530				
	Aroclor 1221	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1232	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1242	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1248	µg/kg	EPA 8082	ND	U	ND	U	ND	U	1,500				
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	300				
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	200				
	Aroclor 1262	µg/kg	EPA 8082	--		--		--		--				
	Aroclor 1268	µg/kg	EPA 8082	--		--		--		--				
	Total PCBs	µg/kg	EPA 8082	--		--		--		0.041				

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-5

Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
PCBs	Aroclor 1016	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	530	
	Aroclor 1221	µg/kg	EPA8082	195	U	974	U	35.1	U	172	U	18.9	U	1910	U	--	
	Aroclor 1232	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	--	
	Aroclor 1242	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	660	J	3790		135	J	1070		52.2	J	11200		300	
	Aroclor 1260	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	200	
	Aroclor 1262	µg/kg	EPA8082	306	J	1160	J	190	J	514	J	46.2	J	2960	J	--	
	Aroclor 1268	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	--	
	Total PCBs	µg/kg	EPA 8082	966	J	4950	J	325	J	1584	J	98.4	J	14160	J	0.041	

Please refer to notes at end of table.

Table A-5

Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
PCBs	Aroclor 1016	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	1.88	U	530	
	Aroclor 1221	µg/kg	EPA8082	4040	U	733	U	1990	U	1890	U	4160	U	3.75	U	--	
	Aroclor 1232	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	1.88	U	--	
	Aroclor 1242	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	1.88	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	1.88	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	24700	J	3920		11400		12000		24500		4.96		300	
	Aroclor 1260	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	2.67	J	200	
	Aroclor 1262	µg/kg	EPA8082	6480	J	1020	J	4360	J	2310	J	3840	J	1.88	U	--	
	Aroclor 1268	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	1.88	U	--	
	Total PCBs	µg/kg	EPA 8082	31180	J	4940	J	15760	J	14310	J	28340	J	7.63	J	0.041	

Please refer to notes at end of table.

Table A-5

Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Primary Screening Level	
				Sample Date		10/15/2010			
				Result	Flag	Result	Flag		
PCBs	Aroclor 1016	µg/kg	EPA 8082	2.00	U	2.15	U	530	
	Aroclor 1221	µg/kg	EPA 8082	4.00	U	4.28	U	--	
	Aroclor 1232	µg/kg	EPA 8082	2.00	U	2.15	U	--	
	Aroclor 1242	µg/kg	EPA 8082	2.00	U	2.15	U	1,500	
	Aroclor 1248	µg/kg	EPA 8082	2.00	U	2.15	U	1,500	
	Aroclor 1254	µg/kg	EPA 8082	14.6		2.15	U	300	
	Aroclor 1260	µg/kg	EPA 8082	14.5		9.8		200	
	Aroclor 1262	µg/kg	EPA 8082	2.00	U	2.15	U	--	
	Aroclor 1268	µg/kg	EPA 8082	2.00	U	2.15	U	--	
	Total PCBs	µg/kg	EPA 8082	29.1		9.8		0.041	

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-6

Composite Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Primary Screening Level			
				Composite-07-FS	Composite-11-FS	Composite-14-FS				
				Sample Date	10/15/2010	10/15/2010	10/15/2010			
PCBs	Aroclor 1016	µg/kg	EPA 8082	1030	U	394	U	973	U	530
	Aroclor 1221	µg/kg	EPA 8082	2060	U	786	U	1940	U	--
	Aroclor 1232	µg/kg	EPA 8082	1030	U	394	U	973	U	--
	Aroclor 1242	µg/kg	EPA 8082	1030	U	394	U	973	U	1,500
	Aroclor 1248	µg/kg	EPA 8082	1030	U	394	U	973	U	1,500
	Aroclor 1254	µg/kg	EPA 8082	14700		4780	J	17700	J	300
	Aroclor 1260	µg/kg	EPA 8082	1030	U	394	U	973	U	200
	Aroclor 1262	µg/kg	EPA 8082	1030	U	394	U	973	U	--
	Aroclor 1268	µg/kg	EPA 8082	1030	U	394	U	973	U	--
	Total PCBs	µg/kg	EPA 8082	14700		4780	J	17700	J	0.041

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Primary Screening Level	
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010			
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	761		47.3	J	264		6.51	J	4.45	U	48.7	J	200	
	Acenaphthene	µg/kg	EPA 8270M	249		19.7	U	800		15.1	J	4.45	U	26.5	J	300	
	Acenaphthylene	µg/kg	EPA 8270M	535		19.7	U	1,470		5.47	J	4.45	U	35.0	J	200	
	Anthracene	µg/kg	EPA 8270M	694		19.7	U	4,150		44.6		4.45	U	73.6	J	845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	2,460		62.0	J	8,960		83.4		9.32	J	345		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,700		97.1		8,740		90.5		10.9	J	430		270	
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	2,250		124		6,270		61.6		11.7	J	472		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1,710		94.1		6,760		51.5		8.68	J	468		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	1,950		69.6	J	5,830		68.5		11.7	J	412		5,500	
	Chrysene	µg/kg	EPA 8270M	2,840		102		9,990		97.1		17.9	J	475		1,290	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	489		21.2	J	1,480		16.2	J	4.45	U	113		270	
	Fluoranthene	µg/kg	EPA 8270M	5,710		107		18,600		242		33.4		546		2,230	
	Fluorene	µg/kg	EPA 8270M	457		19.7	U	1,270		19.6		4.54	J	28.5	J	536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1,400		65.9	J	5,100		47.8		7.77	J	372		100	
	Naphthalene	µg/kg	EPA 8270M	1,020		52.7	J	308		20.5		4.45	U	65.6	J	561	
	Phenanthrene	µg/kg	EPA 8270M	2,380		80.1	J	18,100		150		42.4		298		1,170	
	Pyrene	µg/kg	EPA 8270M	5,040		126		24,200		268		37.7		577		1,520	
	LPAHs	µg/kg	--	6,100		260		26,360		260		70		580		1,400	
	HPAHs	µg/kg	--	26,550		870		95,930		1,030		150		4,210		5,500	
	Total PAHs	µg/kg	--	32,650		1,130		122,290		1,290		220		4,790		22,800	
	BaP Eq	µg/kg	--	3,840		150		12,390		130		20		670		12	

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS		090810-3-3.4-10-02-FS		100510-3-3.5-05-01-FS		100610-3-3.6-15-03 FS		100710-3-3.7-Surface -11FS		100710-3-3.7-5-01-FS		Primary Screening Level				
				Sample Date		9/8/2010		9/8/2010		10/5/2010		10/6/2010		10/7/2010						
				Depth (Feet Below Ground Surface)		5 - 10		10 - 15		0 - 5		10 - 15		0						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	386		54.3		27.8	J	3.52	U	77.6	J	20.2	J	200				
	Acenaphthene	µg/kg	EPA 8270M	49.7	U	20.6	J	27.4	J	3.52	U	56.8	J	17.9	U	300				
	Acenaphthylene	µg/kg	EPA 8270M	108	J	63.3		28.4	J	3.65	J	98.6	J	25.7	J	200				
	Anthracene	µg/kg	EPA 8270M	153	J	61.9		54.1		3.52	U	406		38.4	J	845				
	Benzo(a)anthracene	µg/kg	EPA 8270M	1,280		382		339		4.41	J	1,270		144		1,050				
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,090		646		316		7.02	J	986		214		270				
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	2,590		765		742		4.26	J	1,020		204		2,700				
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,960		811		388		6.16	J	1,010		230		300				
	Benzo(k)fluranthene	µg/kg	EPA 8270M	2,010		672		391		4.96	J	831		152		5,500				
	Chrysene	µg/kg	EPA 8270M	2,050		778		925		5.81	J	1,430		207		1,290				
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	718		203		97.8		3.52	U	225		57.4	J	270				
	Fluoranthene	µg/kg	EPA 8270M	1,220		799		488		10.0	J	3,100		218		2,230				
	Fluorene	µg/kg	EPA 8270M	121	J	21.0	J	23.0	J	3.52	U	75.4	J	17.9	U	536				
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,070		640		303		4.41	J	749		176		100				
	Naphthalene	µg/kg	EPA 8270M	266		86.2		42.1		17.3		106	J	38.3	J	561				
	Phenanthrene	µg/kg	EPA 8270M	585		380		193		9.16	J	1,520		154		1,170				
	Pyrene	µg/kg	EPA 8270M	1,780		943		586		13.6	J	2,840		256		1,520				
	LPAHs	µg/kg	--	1,670		690		390		50		2,340		310		1,400				
	HPAHs	µg/kg	--	18,770		6,640		4,580		60		13,460		1,860		5,500				
	Total PAHs	µg/kg	--	20,440		7,330		4,970		110		15,800		2,170		22,800				
	BaP Eq	µg/kg	--	3,450		1,040		560		12		1,530		330		12				

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8.1-10-TOB	100610-3-3.8.5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10.5-01-FS	Primary Screening Level				
				Sample Date	10/6/2010	10/6/2010	10/7/2010	10/7/2010	10/7/2010					
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0					
				Result	Flag	Result	Flag	Result	Flag					
				Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	82.9	J	60.3	J	20.6		28.7	J	5.30	J	200
	Acenaphthene	µg/kg	EPA 8270M	15.7	J	85.5		13.7		12.8	J	3.87	UJ	300
	Acenaphthylene	µg/kg	EPA 8270M	71.7	J	53.3	J	31.1		40.8		10.3	J	200
	Anthracene	µg/kg	EPA 8270M	105	J	142		53.3		273		12.1	J	845
	Benzo(a)anthracene	µg/kg	EPA 8270M	281	J	653		155		634		35.3	J	1,050
	Benzo(a)pyrene	µg/kg	EPA 8270M	366	J	681		199		657		45.3	J	270
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	409	J	723		185		637		37.1	J	2,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	430	J	644		210		570		45.6	J	300
	Benzo(k)fluranthene	µg/kg	EPA 8270M	296	J	576		138		562		30.4	J	5,500
	Chrysene	µg/kg	EPA 8270M	443	J	877		212		753		46.8	J	1,290
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	94.1	J	173		43.8		151		8.69	J	270
	Fluoranthene	µg/kg	EPA 8270M	562	J	1,630		283		1,450		65.2	J	2,230
	Fluorene	µg/kg	EPA 8270M	21.9	J	77.4		15.5		74.6		3.87	UJ	536
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	322	J	524		164		473		33.6	J	100
	Naphthalene	µg/kg	EPA 8270M	142	J	104		27.8		76.5		19.2	J	561
	Phenanthrene	µg/kg	EPA 8270M	453	J	1,160		161		961		39.8	J	1,170
	Pyrene	µg/kg	EPA 8270M	711	J	1,310		314		1,260		80.6	J	1,520
	LPAHs	µg/kg	--	900		1,680		330		1,550		90		1,400
	HPAHs	µg/kg	--	3,910		7,790		1,900		7,150		430		5,500
	Total PAHs	µg/kg	--	4,810		9,470		2,230		8,700		3,020		22,800
	BaP Eq	µg/kg	--	570		1,060		300		990		450		70

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-	Primary Screening Level
				10-02-FS	
				Sample Date	10/7/2010
				Depth (Feet Below Ground Surface)	5 - 10
PAHs				Result	Flag
	2-Methylnaphthalene	µg/kg	EPA 8270M	36.4	
	Acenaphthene	µg/kg	EPA 8270M	31.8	300
	Acenaphthylene	µg/kg	EPA 8270M	19.4	200
	Anthracene	µg/kg	EPA 8270M	24.5	845
	Benzo(a)anthracene	µg/kg	EPA 8270M	17.8	1,050
	Benzo(a)pyrene	µg/kg	EPA 8270M	24.6	270
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	19.8	2,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.4	300
	Benzo(k)fluranthene	µg/kg	EPA 8270M	15.8	5,500
	Chrysene	µg/kg	EPA 8270M	23.6	1,290
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	3.78	U
	Fluoranthene	µg/kg	EPA 8270M	83.9	2,230
	Fluorene	µg/kg	EPA 8270M	22.8	536
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.6	J
	Naphthalene	µg/kg	EPA 8270M	120	561
	Phenanthrene	µg/kg	EPA 8270M	104	1,170
	Pyrene	µg/kg	EPA 8270M	102	1,520
LPAHs		µg/kg	--	360	1,400
HPAHs		µg/kg	--	330	5,500
Total PAHs		µg/kg	--	690	22,800
BaP Eq		µg/kg	--	30	12

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level			
				Sample Date		12/19/2003	12/19/2003	12/19/2003	12/19/2003	12/19/2003	12/19/2003				
				Depth (Feet Below Ground Surface)		0.5	2.5	2.5 DUP	0.5	1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	300			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200			
	Anthracene	µg/kg	EPA 8270M	17.4		ND	U	ND	U	ND	U	845			
	Benzo(a)anthracene	µg/kg	EPA 8270M	47.9		22.6		32.8		244		1,050			
	Benzo(a)pyrene	µg/kg	EPA 8270M	38.4		10.1		20.2		126		270			
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	62.8		10.1		24.4		169		2,700			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	34		<10.0		18.5		219		300			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	13.9		<10.0		10.1		ND	U	5,500			
	Chrysene	µg/kg	EPA 8270M	41.8		<10.0		11.8		ND	U	1,290			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	11.3		ND	U	ND	U	ND	U	270			
	Fluoranthene	µg/kg	EPA 8270M	69.7		10.9		30.3		253		2,230			
	Fluorene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	536			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	30.5		<10.0		15.1		118		100			
	Naphthalene	µg/kg	EPA 8270M	11.3		15.1		12.6		ND	U	561			
	Phenanthrene	µg/kg	EPA 8270M	43.6		10.9		27.8		228		1,170			
	Pyrene	µg/kg	EPA 8270M	68		16.8		51.3		337		1,520			
	LPAHs	µg/kg	--	70		30		40		220		1,400			
	HPAHs	µg/kg	--	420		70		210		1,470		5,500			
	Total PAHs	µg/kg	--	490		100		250		1,690		22,800			
	BaP Eq	µg/kg	--	60		13		30		180		12			

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level
				Sample Date		12/18/2003		12/18/2003		12/18/2003		
				Depth (Feet Below Ground Surface)		0.5		2		0.5		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	300
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200
	Anthracene	µg/kg	EPA 8270M	135		261		ND	U	ND	U	845
	Benzo(a)anthracene	µg/kg	EPA 8270M	499		1,040		404		142		1,050
	Benzo(a)pyrene	µg/kg	EPA 8270M	467		988		311		109		270
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	602		877		404		150		2,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	348		664		278		112		300
	Benzo(k)fluranthene	µg/kg	EPA 8270M	261		340		160		101		5,500
	Chrysene	µg/kg	EPA 8270M	578		1,640		219		86.1		1,290
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	270
	Fluoranthene	µg/kg	EPA 8270M	720		1,190		539		112		2,230
	Fluorene	µg/kg	EPA 8270M	ND		111		ND	U	ND	U	536
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	301		450		219		52.4		100
	Naphthalene	µg/kg	EPA 8270M	ND	U	253		ND	U	ND	U	561
	Phenanthrene	µg/kg	EPA 8270M	459		1,220		185		711		1,170
	Pyrene	µg/kg	EPA 8270M	689		2,040		463		195		1,520
	LPAHs	µg/kg	--	590		1,840		180		710		1,400
	HPAHs	µg/kg	--	4,470		9,230		3,000		1,060		5,500
	Total PAHs	µg/kg	--	5,060		11,070		3,180		1,770		22,800
	BaP Eq	µg/kg	--	610		1,240		420		150		12

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34		Primary Screening Level		
				Sample Date		12/17/2003	12/17/2003				
				Depth (Feet Below Ground Surface)	0.5	2.5	2				
				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200	
	Acenaphthene	µg/kg	EPA 8270M	ND	U	32.1		ND	U	300	
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	36.5		ND	U	200	
	Anthracene	µg/kg	EPA 8270M	ND	U	343		ND	U	845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	86.1		532		270		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	115		903		314		270	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	118		512		326		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	117		1,130		196		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	83.1		462		239	U	5,500	
	Chrysene	µg/kg	EPA 8270M	109		684		344	U	1,290	
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	ND	U	19.5		ND	U	270	
	Fluoranthene	µg/kg	EPA 8270M	156		2,480		400		2,230	
	Fluorene	µg/kg	EPA 8270M	ND	U	23		ND	U	536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	86.9		703		164		100	
	Naphthalene	µg/kg	EPA 8270M	ND	U	48.2		ND	U	561	
	Phenanthrene	µg/kg	EPA 8270M	79.3		2,230		183		1,170	
	Pyrene	µg/kg	EPA 8270M	191		3,350		607		1,520	
	LPAHs	µg/kg	--	80		2,710		180		1,400	
	HPAHs	µg/kg	--	1,060		10,780		2,860		5,500	
	Total PAHs	µg/kg	--	1,140		13,490		3,040		22,800	
	BaP Eq	µg/kg	--	150		1,110		390		12	

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004		2/24/2004						
				Depth (Feet Below Ground Surface)		0.5	2	0.5	2.5							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	10,300		200				
	Acenaphthene	µg/kg	EPA 8270M	ND	U	41.3		ND	U	26,900		300				
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	191		ND	U	647		200				
	Anthracene	µg/kg	EPA 8270M	ND		178		143		23,300		845				
	Benzo(a)anthracene	µg/kg	EPA 8270M	81.9		579		492		20,800		1,050				
	Benzo(a)pyrene	µg/kg	EPA 8270M	110		712		478		12,400		270				
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	109		572		410		10,900		2,700				
	Benzo(ghi)perylene	µg/kg	EPA 8270M	132		816		331		1,660		300				
	Benzo(k)fluranthene	µg/kg	EPA 8270M	105		617		413		12,900		5,500				
	Chrysene	µg/kg	EPA 8270M	111		719		571		24,500		1,290				
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	150		90		844		270				
	Fluoranthene	µg/kg	EPA 8270M	150		1,250		872		50,500		2,230				
	Fluorene	µg/kg	EPA 8270M	ND	U	125		ND	U	20,300		536				
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	91		571		268		1,870		100				
	Naphthalene	µg/kg	EPA 8270M	ND	U	357		ND	U	10,900		561				
	Phenanthrene	µg/kg	EPA 8270M	88.5		1,250		577		75,900		1,170				
	Pyrene	µg/kg	EPA 8270M	166		1,690		1,190		53,500		1,520				
	LPAHs	µg/kg	--	80		2,140		720		168,250		1,400				
	HPAHs	µg/kg	--	1,060		7,680		5,120		189,870		5,500				
	Total PAHs	µg/kg	--	1,140		9,820		5,840		358,120		22,800				
	BaP Eq	µg/kg	--	140		1,050		690		16,770		12				

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level			
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)	0.5	2.5	5						
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	300			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200			
	Anthracene	µg/kg	EPA 8270M	ND	U	22.7		ND	U	845			
	Benzo(a)anthracene	µg/kg	EPA 8270M	50.4		70.6		27.1		1,050			
	Benzo(a)pyrene	µg/kg	EPA 8270M	30.7		46.3		23.8		270			
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	48.8		57.6		19.7		2,700			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.6		27.6		16.4		300			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		33.3		21.3		5,500			
	Chrysene	µg/kg	EPA 8270M	19.7		27.6		19.7		1,290			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND		270			
	Fluoranthene	µg/kg	EPA 8270M	30		77.9		13.9		2,230			
	Fluorene	µg/kg	EPA 8270M	ND	U	10.6		ND	U	536			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.9		23.5		ND	U	100			
	Naphthalene	µg/kg	EPA 8270M	19.7	U	ND		ND	U	561			
	Phenanthrene	µg/kg	EPA 8270M	27.5		68.2		ND	U	1,170			
	Pyrene	µg/kg	EPA 8270M	76.3		124		41.8		1,520			
	LPAHs	µg/kg	--	50		100		0		1,400			
	HPAHs	µg/kg	--	290		490		180		5,500			
	Total PAHs	µg/kg	--	340		590		180		22,800			
	BaP Eq	µg/kg	--	40		60		30		12			

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level			
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)	0.5	2	5						
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200			
	Acenaphthene	µg/kg	EPA 8270M	50.6		ND	U	ND	U	300			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200			
	Anthracene	µg/kg	EPA 8270M	64.7		ND	U	132		845			
	Benzo(a)anthracene	µg/kg	EPA 8270M	1,340		73.2		2,890		1,050			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,380		97.7		4,030		270			
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	2,280		119		4,070		2,700			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1,180		101		3,120		300			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3,230		61.8		3,590		5,500			
	Chrysene	µg/kg	EPA 8270M	2,730		95.2		3,990		1,290			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	486		27.7		1,320		270			
	Fluoranthene	µg/kg	EPA 8270M	1,240		61.8		2,910		2,230			
	Fluorene	µg/kg	EPA 8270M	35.7		ND	U	ND	U	536			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1,280		85.4		2,920		100			
	Naphthalene	µg/kg	EPA 8270M	93.7		22		ND		561			
	Phenanthrene	µg/kg	EPA 8270M	477		35		762		1,170			
	Pyrene	µg/kg	EPA 8270M	1,310		84.6		3,170		1,520			
	LPAHs	µg/kg	--	720		50		890		1,400			
	HPAHs	µg/kg	--	17,460		810		32,010		5,500			
	Total PAHs	µg/kg	--	18,180		860		32,900		22,800			
	BaP Eq	µg/kg	--	3,400		150		6,410		12			

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314					Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	Methylanthracene	µg/kg	EPA 8270M	ND	U	ND	U	--		200			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	52.3		40.3		300			
	Acenaphthynone	µg/kg	EPA 8270M	ND	U	1,270		ND	U	200			
	Anthracene	µg/kg	EPA 8270M	ND	U	744		45.6		845			
	Benz(a)anthracene	µg/kg	EPA 8270M	242		3,010		334		1,050			
	Benz(a)pyrene	µg/kg	EPA 8270M	ND	U	3,270		446		270			
	Biphenyl	µg/kg	EPA 8270M	10.8		2,830		605		2,700			
	Benz(b)anthracene	µg/kg	EPA 8270M	ND	U	2,840		212		300			
	Benz(k)anthracene	µg/kg	EPA 8270M	ND	U	3,660		313		5,500			
	Chrysene	µg/kg	EPA 8270M	ND	U	3,470		539		1,290			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	ND	U	381		71.5		270			
	Fluorene	µg/kg	EPA 8270M	10.8		6,790		321		2,230			
	Fluorene(1,2,3,4-tetrahydro)	µg/kg	EPA 8270M	ND	U	208		27.4		536			
	Naphthalene	µg/kg	EPA 8270M	ND	U	2,020		218		100			
	Phenanthrene	µg/kg	EPA 8270M	ND	U	204		49.5		561			
	Pyrene	µg/kg	EPA 8270M	20.9		4,380		189		1,170			
	LPAHs	µg/kg	--	0		10,800		495		1,520			
	HPAHs	µg/kg	--	280		6,860		360		1,400			
	Total PAHs	µg/kg	--	280		39,070		3,550		5,500			
	BaP Eq	µg/kg	--	25		45,930		3,910		22,800			
						4,510		640		12			

Please refer to notes at end of table.

Table A-7

Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level			
				Sample Date		12/22/2003		12/22/2003					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	322		ND	U	300			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	102		ND	U	200			
	Anthracene	µg/kg	EPA 8270M	44.1		429		11.6		845			
	Benzo(a)anthracene	µg/kg	EPA 8270M	84.2		543		26.2		1,050			
	Benzo(a)pyrene	µg/kg	EPA 8270M	40.9		338		11.6		270			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	75.4		338		11.6		2,700			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	46.5		169		ND	U	300			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	78.6		177		ND	U	5,500			
	Chrysene	µg/kg	EPA 8270M	120		1,400		ND	U	1,290			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	270			
	Fluoranthene	µg/kg	EPA 8270M	64.2		544		41.7		2,230			
	Fluorene	µg/kg	EPA 8270M	ND	U	940		10		536			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	26.5		66.8		ND	U	100			
	Naphthalene	µg/kg	EPA 8270M	ND	U	ND	U	56.3		561			
	Phenanthrene	µg/kg	EPA 8270M	43.3		1,190		50.9		1,170			
	Pyrene	µg/kg	EPA 8270M	93.1		2,170		61		1,520			
	LPAHs	µg/kg	--	90		2,980		130		1,400			
	HPAHs	µg/kg	--	630		5,750		150		5,500			
	Total PAHs	µg/kg	--	720		8,730		280		22,800			
	BaP Eq	µg/kg	--	60		440		20		12			

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-8

Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	112		80.3		76.0		39.3		22.0	J	91.8		200	
	Acenaphthene	µg/kg	EPA 8270M	130		101		7.50	J	13.4	J	9.8	J	51.4		300	
	Acenaphthylene	µg/kg	EPA 8270M	63.1	J	86.6		23.9	J	43.9		14.8	J	37.2		200	
	Anthracene	µg/kg	EPA 8270M	214		286		43.4		30.1		23.4	J	115		845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	428		1,370		106		127		139		318		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	501		967		149		206	J	244		426		270	
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	477		1,570		134		257		240		469		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	483		861		357		327		289		581		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	372		969		105		180		177		372		5,500	
	Chrysene	µg/kg	EPA 8270M	550		2,180		179		318		217		428		1,290	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	109		280		47.5		56.0		72.2		131		270	
	Fluoranthene	µg/kg	EPA 8270M	877		1,870		216		637		234		637		2,230	
	Fluorene	µg/kg	EPA 8270M	113		103		11.2	J	32.8		12.7	J	43.5		536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	361		700		152		216		228		409		100	
	Naphthalene	µg/kg	EPA 8270M	125		150		55.9		124		26.2	J	117		561	
	Phenanthrene	µg/kg	EPA 8270M	1,070		1,110		212		697		191		394		1,170	
	Pyrene	µg/kg	EPA 8270M	924		1,670		259		758		288		618		1,520	
	LPAHs	µg/kg	--	1,830		1,910		430		980		300		850		1,400	
	HPAHs	µg/kg	--	5,080		12,440		1,700		3,080		2,130		4,390		5,500	
	Total PAHs	µg/kg	--	6,910		14,350		2,130		4,060		2,430		5,240		22,800	
	BaP Eq	µg/kg	--	750		1,630		240		330		380		690		10	

Please refer to notes at end of table.

Table A-8

Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	192		44.3		94.1		56.6		31.6	J	12.1	J	200	
	Acenaphthene	µg/kg	EPA 8270M	291		23.4	J	116		20.4	J	17.2	J	5.36	J	300	
	Acenaphthylene	µg/kg	EPA 8270M	166		26.6	J	104		183		34.7		8.73	J	200	
	Anthracene	µg/kg	EPA 8270M	2,000		65.3		604		165		60.1		9.12	J	845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	5,870		231		1,800		559		210		16.3		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	3,970		284		1,680		705		278		18.7		270	
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	4,060		316		1,710		597		260		42.5		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,730		295		1,210		748		315		21.3		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3,450		219		1,370		467		236		18.8		5,500	
	Chrysene	µg/kg	EPA 8270M	6,390		316		1,990		685		283		36.6		1,290	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	874		71.3		300		135		66.8		4.39	J	270	
	Fluoranthene	µg/kg	EPA 8270M	10,300		393		3,910		1,150		368		41.0		2,230	
	Fluorene	µg/kg	EPA 8270M	366		21.4	J	123		34.0		15.8	J	8.12	J	536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,430		221		1,010		540		238		15.7		100	
	Naphthalene	µg/kg	EPA 8270M	401		56.5		169		111		54.1		33.8		561	
	Phenanthrene	µg/kg	EPA 8270M	7,490		198		2,080		720		188		35.5		1,170	
	Pyrene	µg/kg	EPA 8270M	11,200		402		3,790		1,340		390		41.0		1,520	
	LPAHs	µg/kg	--	10,910		430		3,290		1,290		410		110		1,400	
	HPAHs	µg/kg	--	51,270		2,750		18,770		6,930		2,640		260		5,500	
	Total PAHs	µg/kg	--	62,180		3,180		22,060		8,220		3,050		370		22,800	
	BaP Eq	µg/kg	--	6,150		440		2,460		1,020		420		30		10	

Please refer to notes at end of table.

Table A-8

Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Primary Screening Level	
				Sample Date		10/15/2010			
				Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	9.36	J	4.94	J	200	
	Acenaphthene	µg/kg	EPA 8270M	3.92	U	4.23	U	300	
	Acenaphthylene	µg/kg	EPA 8270M	9.18	J	10.3	J	200	
	Anthracene	µg/kg	EPA 8270M	9.18	J	6.47	J	845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	25.6		20.1		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	32.1		28.5		270	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	40.2		24.5		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	29.1		27.9		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	31.2		20.8		5,500	
	Chrysene	µg/kg	EPA 8270M	44.7		27.6		1,290	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	6.82	J	5.53	J	270	
	Fluoranthene	µg/kg	EPA 8270M	66.2		34.0		2,230	
	Fluorene	µg/kg	EPA 8270M	5.82	J	4.23	U	536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	23.6		21.4		100	
	Naphthalene	µg/kg	EPA 8270M	27.2		16.1	J	561	
	Phenanthrene	µg/kg	EPA 8270M	55.1		24.5		1,170	
	Pyrene	µg/kg	EPA 8270M	57.6		48.1		1,520	
	LPAHs	µg/kg		--	120		70	1,400	
	HPAHs	µg/kg		--	360		260	5,500	
	Total PAHs	µg/kg		--	480		330	22,800	
	BaP Eq	µg/kg		--	50		40	10	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-9

Composite Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS		101510-3-3.8-Composite-11-FS		101510-3-3.9-Composite-14-FS		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010			
				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	63.9		42.8		77.1		200	
	Acenaphthene	µg/kg	EPA 8270M	26.2	J	22.0	J	56.6		300	
	Acenaphthylene	µg/kg	EPA 8270M	31.1	J	31.3		44.1		200	
	Anthracene	µg/kg	EPA 8270M	78.9		74.4		128		845	
	Benzo(a)anthracene	µg/kg	EPA 8270M	202		225		394		1,050	
	Benzo(a)pyrene	µg/kg	EPA 8270M	280		280		447		270	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	308		289		417		2,700	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	342		361		474		300	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	267		217		344		5,500	
	Chrysene	µg/kg	EPA 8270M	277		317		526		1,290	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	75.3		76.5		112		270	
	Fluoranthene	µg/kg	EPA 8270M	463		404		724		2,230	
	Fluorene	µg/kg	EPA 8270M	27.2	J	23.0	J	48.4		536	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	246		257		370		100	
	Naphthalene	µg/kg	EPA 8270M	86.6		69.9		118		561	
	Phenanthrene	µg/kg	EPA 8270M	265		270		511		1,170	
	Pyrene	µg/kg	EPA 8270M	394		433		738		1,520	
	LPAHs	µg/kg	--	580		530		980		1,400	
	HPAHs	µg/kg	--	2,850		2,860		4,550		5,500	
	Total PAHs	µg/kg	--	3,430		3,390		5,530		22,800	
	BaP Eq	µg/kg	--	440		440		690		10	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-10
 Boring Sample SVOCs Results
 Schnitzer ASD Yard Riverbank Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	HA-34		HA-37									
				Sample Date		10/7/2010		10/7/2010		10/6/2010		10/6/2010		10/7/2010		12/16/2003		12/19/2003		12/19/2003	
				Depth (Feet Below Ground Surface)				0	0 - 5	0	0 - 5	0	0 - 5	0	0 - 5	2	0.5	2.5	2.5DUP		
SVOCs	1,2,4-Trichlorobenzene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	1,2-Dichlorobenzene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	1,3-Dichlorobenzene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	1,4-Dichlorobenzene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	2,4,5-Trichlorophenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2,4,6-Trichlorophenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2,4-Dichlorophenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2,4-Dimethylphenol	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	2,4-Dinitrophenol	µg/kg	EPA 8270C	8,610	U	4,340	U	9,150	U	8,920	U	4,220	U	8,960	U	--	--	--	--		
	2,4-Dinitrotoluene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	2,6-Dinitrotoluene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	2-Chloronaphthalene	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2-Chlorophenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2-Methylphenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2-Nitroaniline	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	2-Nitrophenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	3,3'-Dichlorobenzidine	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	3,4-Methylphenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	3-Nitroaniline	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	4,6-Dinitro-2-methylphenol	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	4-Bromophenylether	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	4-Chloro-3-methylphenol	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	4-Chloroaniline	µg/kg	EPA 8270C	710	U	358	U	755	U	736	U	349	U	739	U	--	--	--	--		
	4-Chlorophenylphenylether	µg/kg	EPA 8270C	430	U	217	U	457	U	446	U	211	U	448	U	--	--	--	--		
	4-Nitroaniline	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	4-Nitrophenol	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	Benzoic Acid	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	Benzyl Alcohol	µg/kg	EPA 8270C	4,300	U	2,170	U	4,570	U	4,460	U	2,110	U	4,480	U	--	--	--	--		
	Bis (2-chloroethoxy)methane	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Bis (2-chloroethyl)ether	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Bis(2-chloroisopropyl)ether	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Dibenzofuran	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	ND	U	ND	U		
	Hexachlorobenzene	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Hexachlorobutadiene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	Hexachlorocyclopentadiene	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	Hexachloroethane	µg/kg	EPA 8270C	2,150	U	1,080	U	2,290	U	2,230	U	1,060	U	2,240	U	--	--	--	--		
	Isophorone	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Nitrobenzene	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	N-Nitrosodi-n-propylamine	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	N-Nitrosodiphenylamine	µg/kg	EPA 8270C	301	U	152	U	320	U	312	U	148	U	314	U	--	--	--	--		
	Pentachlorophenol	µg/kg																			

Table A-10
Boring Sample SVOCS Results
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC. - Portland, Oregon

Please refer to notes at end of table.

Table A-10
 Boring Sample SVOCs Results
 Schnitzer ASD Yard Riverbank Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	GP-312				GP-313				GP-314				GP-315				Primary Screening Level		
		Sample Date		12/22/2003		12/22/2003		12/22/2003		12/24/2003		12/24/2003		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)		0.5		2.5		0.5		2.5		0.5		2.5		0.5		2.5				
		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
SVOCs	1,2,4-Trichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9,200		
	1,2-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,700		
	1,3-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	300		
	1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	300		
	2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,000		
	2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10,000		
	2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20,000		
	2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20,000		
	2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20,000		
	2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	240,000		
	2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	2-Chlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	60,000		
	2-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50,000		
	2-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	2-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	3,4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	3-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70,000		
	4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	4-Bromophenylether	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	4-Chloro-3-methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	4-Chloroaniline	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40,000		
	4-Chlorophenylphenylether	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	4-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40,000		
	4-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,000		
	Benzoic Acid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Benzyl Alcohol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Bis (2-chloroethoxy)methane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Bis (2-chloroethyl)ether	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Bis(2-chloroisopropyl)ether	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Dibenzofuran	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	--		
	Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3		
	Hexachlorobutadiene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600		
	Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400		
	Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	66,000		
	Isophorone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Nitrobenzene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8,000		
	N-Nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	N-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20,000		
	Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30		
	Phenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-11

Composite Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS		101510-3-3.8-Composite-11-FS		101510-3-3.9-Composite-14-FS		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010			
				Result	Flag	Result	Flag	Result	Flag		
SVOCs	1,2,4-Trichlorobenzene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	9,200	
	1,2-Dichlorobenzene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	1,700	
	1,3 -Dichlorobenzene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	300	
	1,4-Dichlorobenzene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	300	
	2,4,5-Trichlorophenol	µg/kg	EPA 8270C	344	U	330	U	328	U	4,000	
	2,4,6-Trichlorophenol	µg/kg	EPA 8270C	344	U	330	U	328	U	10,000	
	2,4-Dichlorophenol	µg/kg	EPA 8270C	344	U	330	U	328	U	20,000	
	2,4-Dimethylphenol	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	20,000	
	2,4-Dinitrophenol	µg/kg	EPA 8270C	9,830	U	9,420	U	9,360	U	20,000	
	2,4-Dinitrotoluene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	--	
	2,6-Dinitrotoluene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	240,000	
	2-Chloronaphthalene	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	2-Chlorophenol	µg/kg	EPA 8270C	344	U	330	U	328	U	60,000	
	2-Methyphenol	µg/kg	EPA 8270C	344	U	330	U	328	U	50,000	
	2-Nitroaniline	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	2-Nitrophenol	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	3,3'-Dichlorobenzidine	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	--	
	3,4-Methylphenol	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	3-Nitroaniline	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	70,000	
	4,6-Dinitro-2-methylphenol	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	--	
	4-Bromophenylether	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	4-Chloro-3-methylphenol	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	4-Chloroaniline	µg/kg	EPA 8270C	811	U	777	U	772	U	40,000	
	4-Chlorophenylphenylether	µg/kg	EPA 8270C	492	U	471	U	468	U	--	
	4-Nitroaniline	µg/kg	EPA 8270C	344	U	330	U	328	U	40,000	
	4-Nitrophenol	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	7,000	
	Benzoic Acid	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	--	
	Benzyl Alcohol	µg/kg	EPA 8270C	4,920	U	4,710	U	4,680	U	--	
	Bis (2-chloroethoxy)methane	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	Bis (2-chloroethyl)ether	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	Bis(2-chloroisopropyl)ether	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	Dibenzofuran	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	Hexachlorobenzene	µg/kg	EPA 8270C	344	U	330	U	328	U	2.3	
	Hexachlorobutadiene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	600	
	Hexachlorocyclopentadiene	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	400	
	Hexachloroethane	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	66,000	
	Isophorone	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	Nitrobenzene	µg/kg	EPA 8270C	344	U	330	U	328	U	8,000	
	N-Nitrosodi-n-propylamine	µg/kg	EPA 8270C	344	U	330	U	328	U	--	
	N-Nitrosodiphenylamine	µg/kg	EPA 8270C	344	U	330	U	328	U	20,000	
	Pentachlorophenol	µg/kg	EPA 8270C	2,460	U	2,360	U	2,340	U	30	
	Phenol	µg/kg	EPA 8270C	344	U	330	U	328	U	30,000	

Notes:

1. -- = Not Applicable/Not Analyzed

2. µg/kg = micrograms per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level

7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Primary Screening Level	
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010	
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0	
				Result	Flag	Result	Flag	Result	Flag	Result	
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	766		80.2	U	2,070	U	17.0	
	Butylbenzyl phthalate	µg/kg	EPA 8270M	193	U	80.2	U	2,070	U	17.0	
	Diethyl phthalate	µg/kg	EPA 8270M	193	U	80.2	U	415	U	17.0	
	Dimethyl phthalate	µg/kg	EPA 8270M	193	U	80.2	U	415	U	17.0	
	Di-n-butyl phthalate	µg/kg	EPA 8270M	193	U	80.2	U	415	U	17.0	
	Di-n-octyl phthalate	µg/kg	EPA 8270M	965	U	80.2	U	2,070	U	17.0	

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-	090810-3-3.4-10-	100510-3-3.5-05-01-	100610-3-3.6-15-	100710-3-3.7-	100710-3-3.7-	Primary Screening Level									
				FS	02-FS	FS	03 FS	Surface -11FS	5-01-FS										
				Sample Date		9/8/2010		9/8/2010		10/5/2010		10/6/2010		10/7/2010					
				Depth (Feet Below Ground Surface)		5 - 10		10 - 15		0 - 5		10 - 15		0					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	807	U	29.8	U	683		14.3	U	10,000		187	J	22,500			
	Butylbenzyl phthalate	µg/kg	EPA 8270M	807	U	29.8	U	76.9	J	14.3	U	5,670		109	U	--			
	Diethyl phthalate	µg/kg	EPA 8270M	202	U	29.8	U	60.8	U	14.3	U	287	U	109	U	100,000			
	Dimethyl phthalate	µg/kg	EPA 8270M	202	U	29.8	U	60.8	U	14.3	U	287	U	109	U	200,000			
	Di-n-butyl phthalate	µg/kg	EPA 8270M	202	U	29.8	U	60.8	U	14.3	U	601		109	U	200,000			
	Di-n-octyl phthalate	µg/kg	EPA 8270M	1,610	U	29.8	U	73.6	J	14.3	U	3,320		109	U	--			

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10	100610-3-3.8-5-01	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	Primary Screening Level			
				TOB	FS						
				Sample Date		10/6/2010	10/7/2010				
				Depth (Feet Below Ground Surface)		0	0 - 5				
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	27,100		773		4,610	22,500		
	Butylbenzyl phthalate	µg/kg	EPA 8270M	4,900		999		269	--		
	Diethyl phthalate	µg/kg	EPA 8270M	190	U	74.6	U	149	U		
	Dimethyl phthalate	µg/kg	EPA 8270M	190	U	74.6	U	149	U		
	Di-n-butyl phthalate	µg/kg	EPA 8270M	622		102	J	149	U		
	Di-n-octyl phthalate	µg/kg	EPA 8270M	190	U	74.6	U	149	U		

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-Surface -11-WS	100710-3-3.10-01-FS	100710-3-3.10-10-02-FS	Primary Screening Level			
				Sample Date	10/7/2010	10/7/2010				
				Depth (Feet Below Ground Surface)	0	0 - 5	5 - 10			
					Result	Flag	Result			
					Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	578		72.2	J	15.3	U	22,500
	Butylbenzyl phthalate	µg/kg	EPA 8270M	96.7		15.7	UJ	15.3	U	--
	Diethyl phthalate	µg/kg	EPA 8270M	28.9	U	15.7	UJ	15.3	U	100,000
	Dimethyl phthalate	µg/kg	EPA 8270M	28.9	U	15.7	UJ	15.3	U	200,000
	Di-n-butyl phthalate	µg/kg	EPA 8270M	28.9	U	15.7	UJ	15.3	U	200,000
	Di-n-octyl phthalate	µg/kg	EPA 8270M	28.9	U	15.7	UJ	15.3	U	--

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37					HA-38					Primary Screening Level				
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		2.5 DUP		0.5		1.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	682		ND	U	22,500				
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	--				
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		--		100,000				
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		--		200,000				
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	666		ND	U	200,000				
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--		--		--		--				

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level				
				Sample Date		12/18/2003		12/18/2003		12/18/2003						
				Depth (Feet Below Ground Surface)		0.5		2		0.5						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	22,500				
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	--				
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		100,000				
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		200,000				
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200,000				
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--		--		--				

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34		Primary Screening Level	
				Sample Date		12/17/2003	12/17/2003			
				Depth (Feet Below Ground Surface)		0.5	2.5			
				Result		Flag	Result			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	22,500
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		--		100,000
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		--		200,000
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200,000
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--		--

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004		2/24/2004						
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	22,500				
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	11,800		ND	U	ND	U	--				
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		100,000				
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		--		--		200,000				
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200,000				
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--		--		--				

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level				
				Sample Date		12/22/2003	12/22/2003		12/22/2003					
Depth (Feet Below Ground Surface)				0.5	2.5		5							
				Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	586		22,500				
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--				
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		--		100,000				
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		--		200,000				
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200,000				
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--		--				

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313				Primary Screening Level			
				Sample Date		12/22/2003	12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5						
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	765		ND	U	22,500			
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	--			
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		100,000			
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		200,000			
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	200,000			
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--			

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Primary Screening Level			
				Sample Date		2/24/2004	2/24/2004				
Depth (Feet Below Ground Surface)				0.5	2.5						
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	1,050		22,500			
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	992		--			
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		100,000			
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		200,000			
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	200,000			
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--			

Please refer to notes at end of table.

Table A-12

Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Primary Screening Level			
				Sample Date		12/22/2003	12/22/2003				
				Depth (Feet Below Ground Surface)		0.5	2.5				
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	22,500			
	Butylbenzyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	--			
	Diethyl phthalate	µg/kg	EPA 8270M	--		--		100,000			
	Dimethyl phthalate	µg/kg	EPA 8270M	--		--		200,000			
	Di-n-butyl phthalate	µg/kg	EPA 8270M	ND	U	ND	U	200,000			
	Di-n-octyl phthalate	µg/kg	EPA 8270M	--		--		--			

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-13

Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	165		527		69.9	U	129	J	75.5	U	10800		22,500	
	Butylbenzyl phthalate	µg/kg	EPA 8270M	192		511		69.9	U	68.7	U	75.5	U	13600		--	
	Diethyl phthalate	µg/kg	EPA 8270M	77.4	U	77.4	U	69.9	U	68.7	U	75.5	U	770	U	100,000	
	Dimethyl phthalate	µg/kg	EPA 8270M	77.4	U	77.4	U	69.9	U	68.7	U	75.5	U	770	U	200,000	
	Di-n-butyl phthalate	µg/kg	EPA 8270M	77.4	U	124	J	69.9	U	68.7	U	75.5	U	1870		200,000	
	Di-n-octyl phthalate	µg/kg	EPA 8270M	77.4	U	77.4	U	69.9	U	68.7	U	75.5	U	770	U	--	

Please refer to notes at end of table.

Table A-13

Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	5,370		974		710	J	5,320		2,110		15.0	U	22,500	
	Butylbenzyl phthalate	µg/kg	EPA 8270M	887		428		970	J	1,440		1,240		15.0	U	--	
	Diethyl phthalate	µg/kg	EPA 8270M	324	U	58.7	U	63.5	U	152	U	83.6	U	15.0	U	100,000	
	Dimethyl phthalate	µg/kg	EPA 8270M	324	U	58.7	U	63.5	U	152	U	83.6	U	15.0	U	200,000	
	Di-n-butyl phthalate	µg/kg	EPA 8270M	324	U	65.8	J	125	J	257	J	105	J	15.0	U	200,000	
	Di-n-octyl phthalate	µg/kg	EPA 8270M	324	U	58.7	U	63.5	U	529		83.6	U	15.0	U	--	

Please refer to notes at end of table.

Table A-13

Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Primary Screening Level	
				Sample Date		10/15/2010			
				Result	Flag	Result	Flag		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	26.7	J	17.1	U	22,500	
	Butylbenzyl phthalate	µg/kg	EPA 8270M	15.9	U	17.1	U	--	
	Diethyl phthalate	µg/kg	EPA 8270M	15.9	U	17.1	U	100,000	
	Dimethyl phthalate	µg/kg	EPA 8270M	15.9	U	17.1	U	200,000	
	Di-n-butyl phthalate	µg/kg	EPA 8270M	15.9	U	17.1	U	200,000	
	Di-n-octyl phthalate	µg/kg	EPA 8270M	15.9	U	17.1	U	--	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-14

Composite Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Primary Screening Level	
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	10/15/2010	10/15/2010	10/15/2010	
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	31,200		1,370		22,500
	Butylbenzyl phthalate	µg/kg	EPA 8270M	9,000		2,630		--
	Diethyl phthalate	µg/kg	EPA 8270M	828	U	78.3	U	100,000
	Dimethyl phthalate	µg/kg	EPA 8270M	828	U	78.3	U	200,000
	Di-n-butyl phthalate	µg/kg	EPA 8270M	828	J	286		200,000
	Di-n-octyl phthalate	µg/kg	EPA 8270M	828	U	155	J	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Primary Screening Level	
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010	
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0	
				Result	Flag	Result	Flag	Result	Flag	Result	
Organotins	Dibutyltin	µg/kg	PSEP	0.44	U	0.48	U	0.50	UJ	15	--
	Monobutyltin	µg/kg	PSEP	0.42	U	0.46	U	0.47	UJ	0.51	--
	Tetra-n-butyltin	µg/kg	PSEP	1.3	U	1.4	U	1.5	UJ	1.6	--
	Tributyltin	µg/kg	PSEP	0.94	U	1.0	U	1.1	UJ	1.1	2.3
										34	
										30	
										1.4	
										U	
										23	

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03-FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Primary Screening Level		
				Sample Date	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010		
				Depth (Feet Below Ground Surface)	5 - 10	0 - 5	10 - 15	0	0 - 5	0		
				Result	Flag	Result	Flag	Result	Flag	Result		
Organotins	Dibutyltin	µg/kg	PSEP	0.49	U	0.47	U	0.42	U	0.43	U	--
	Monobutyltin	µg/kg	PSEP	0.47	U	8.8		0.40	U	0.41	U	--
	Tetra-n-butyltin	µg/kg	PSEP	1.4	U	1.4	U	1.2	U	1.2	U	--
	Tributyltin	µg/kg	PSEP	1.1	U	2.9		0.9	U	0.90	U	9.9 2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Primary Screening Level						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5							
				Result	Flag	Result	Flag	Result	Flag							
				Result	Flag	Result	Flag	Result	Flag							
Organotins	Dibutyltin	µg/kg	PSEP	0.46	U	6.5	U	0.46	U	0.42	U	0.45	UJ	29	--	
	Monobutyltin	µg/kg	PSEP	0.43	U	0.39	U	0.44	U	0.40	U	0.43	UJ	0.42	U	--
	Tetra-n-butyltin	µg/kg	PSEP	1.3	U	1.2	U	1.3	U	1.2	U	1.3	UJ	1.3	U	--
	Tributyltin	µg/kg	PSEP	0.98	U	30		0.99	U	0.91	U	0.97	UJ	0.95	U	2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Primary Screening Level
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	3.88		ND	U	--								
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	--
	Tributyltin	µg/kg	PSEP	8.44		ND	U	2.3								

Please refer to notes at end of table.

* PSEP M is referred to as a method developed by the Washington State Department of Ecology for the Pudget Sound Estuary Program

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level			
				Sample Date		12/18/2003	12/18/2003		12/18/2003	12/18/2003					
				Depth (Feet Below Ground Surface)	0.5	2		0.5	2						
					Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.44		ND	U	--			
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.62		ND	U	--			
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND		ND	U	--			
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	10.5		ND	U	2.3			

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Primary Screening Level
				Sample Date		12/17/2003		12/17/2003		
				Result	Flag	Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.75	--	
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.5	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	--	
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	6.05	U	
										2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level				
				Sample Date		2/24/2004		2/24/2004		2/24/2004						
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Organotins	Dibutyltin	µg/kg	PSEP	16.6		10.5		ND	U	15.2		--				
	Monobutyltin	µg/kg	PSEP	13.4		13.4		ND	U	9.83		--				
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	--				
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	15.7		2.3				

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Primary Screening Level
				Sample Date		12/22/2003	12/22/2003	
				Depth (Feet Below Ground Surface)		0.5	2.5	
				Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	15.1	--	
	Monobutyltin	µg/kg	PSEP	45.1		13.4	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	--	
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313				Primary Screening Level
				Sample Date		12/22/2003	12/22/2003	
Depth (Feet Below Ground Surface)				0.5	2.5			
				Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	11.8	--	
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Philates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Primary Screening Level
				Sample Date		2/24/2004	2/24/2004	
				Depth (Feet Below Ground Surface)		0.5	2.5	
				Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	14.3	--	
	Monobutyltin	µg/kg	PSEP	ND	U	14.2	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	--	
	Tributyltin	µg/kg	PSEP	ND	U	15.9	U	2.3

Please refer to notes at end of table.

Table A-15

Boring Sample Philates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Primary Screening Level
				Sample Date	12/22/2003	12/22/2003		
				Depth (Feet Below Ground Surface)	0.5	2.5		
				Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	21		26.1	--	
	Monobutyltin	µg/kg	PSEP	23.4		10.4	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--
	Tributyltin	µg/kg	PSEP	26.1		ND	U	2.3

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.
8. PSEP = Puget Sound Estuary Program method.

Table A-16

Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Primary Screening Level	
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010			
						Result	Flag										
Organotins	Dibutyltin	µg/kg	PSEP	0.48	U	0.46	U	0.50	U	0.52	U	0.51	U	0.54	U	--	
	Monobutyltin	µg/kg	PSEP	0.46	U	0.44	U	0.48	U	0.50	U	0.49	U	0.52	U	--	
	Tetra-n-butyltin	µg/kg	PSEP	1.4	U	1.4	U	1.5	U	1.5	U	1.5	U	1.6	U	--	
	Tributyltin	µg/kg	PSEP	1.0	U	1.0	U	1.1	U	1.1	U	1.1	U	1.2	U	2.3	

Please refer to notes at end of table.

Table A-16

Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Primary Screening Level
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	48	U	0.42	U	0.47	U	0.44	U	0.48	U	0.45	U	--
	Monobutyltin	µg/kg	PSEP	0.45	U	0.40	U	0.45	U	0.42	U	0.45	U	0.43	U	--
	Tetra-n-butyltin	µg/kg	PSEP	1.4	U	1.2	U	1.4	U	1.3	U	1.4	U	1.3	U	--
	Tributyltin	µg/kg	PSEP	1.0	U	0.89	U	1.0	U	0.94	U	1.0	U	0.97	U	2.3

Please refer to notes at end of table.

Table A-16

Surface Sample Organotins Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Primary Screening Level	
				Sample Date		10/15/2010			
				Result	Flag	Result	Flag		
Organotins	Dibutyltin	µg/kg	PSEP	0.50	U	0.45	U	--	
	Monobutyltin	µg/kg	PSEP	0.48	U	0.43	U	--	
	Tetra-n-butyltin	µg/kg	PSEP	1.5	U	1.3	U	--	
	Tributyltin	µg/kg	PSEP	1.1	U	0.98	U	2.3	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.
8. PSEP = Puget Sound Estuary Program method.

Table A-17

Composite Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Primary Screening Level
				Composite-07-FS	Composite-11-FS	Composite-14-FS	
				Sample Date	10/15/2010	10/15/2010	10/15/2010
Organotins	Dibutyltin	µg/kg	PSEP	0.48	U	0.47	U
	Monobutyltin	µg/kg	PSEP	0.46	U	0.45	U
	Tetra-n-butyltin	µg/kg	PSEP	1.4	U	1.4	U
	Tributyltin	µg/kg	PSEP	34		1.0	U
						0.98	U
							2.3

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.
8. PSEP = Puget Sound Estuary Program method.

Table A-18

Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Composite-12-WS		101510-3-3.7-Composite-07-FS		100610-3-3.8-Composite WS		101510-3-3.8-Composite-11-FS		100710-3-3.9-Composite-11-WS		101510-3-3.9-Composite-14-FS		Primary Screening Level	
				Sample Date		10/7/2010		10/15/2010		10/6/2010		10/15/2010		10/7/2010			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Dioxins/Furans	1,2,3,4,6,7,8-HpCDD	ng/kg	EPA 8290	120		4,600	J	79		1,200		100		1,500		85	
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	42		890		26		290		35		650		85	
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	5.7		140		2.7		J	34	4.3	J	73		85	
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	1.8	J	49		0.9	J	9.8		0.93	J	13		0.34	
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	17		280		6.9		57		11		210		0.34	
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	5.9		170		4.2	J	51		4.7	J	77		0.34	
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	8.2		180		3.5	J	39		5.4		110		0.34	
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	4.7	J	95		1.7	J	20		3.0	J	36		0.34	
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	0.7	J	21		0.52	U	2.6		0.36	J	9.3		0.34	
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	1.1	J	24		0.73	J	7.7		0.22	U	13		0.034	
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	6.1		170		2.7	J	29		4.3	J	96		0.31	
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	6.5		180		3.0	J	34		4.0		110		0.34	
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	12		440		5.5		68		8.6		210		0.0037	
	2,3,7,8-TCDD	ng/kg	EPA 8290	0.51	J	6.3		0.35	J	2.9		0.069	U	4.6		0.0011	
	2,3,7,8-TCDF	ng/kg	EPA 8290	11		330		5.1		89		15		200		0.094	
	OCDD	ng/kg	EPA 8290	1,200		28,000	J	970		10,000	J	1,200		14,000	J	2,800	
	OCDF	ng/kg	EPA 8290	60		1,100		41		530		67		820		2,800	
	Total HpCDD	ng/kg	EPA 8290	250		8,100		160		2,300		220		3,000		--	
	Total HpCDF	ng/kg	EPA 8290	100		2,000		65		830		98		16,000		--	
	Total HxCDD	ng/kg	EPA 8290	56		1,400		27		390		36		240		--	
	Total HxCDF	ng/kg	EPA 8290	96		2,200		44		590		73		1,200		--	
	Total PeCDD	ng/kg	EPA 8290	17		270		5.1		74		1.8		51		--	
	Total PeCDF	ng/kg	EPA 8290	92		2,300		38		490		59		1,100		--	
	Total TCDD	ng/kg	EPA 8290	12		83		3.4		23		1.6		47		0.0011	
	Total TCDF	ng/kg	EPA 8290	70		2,100		34		410		57		1,000		--	

Please refer to notes at end of table.

Table A-18

Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	2468-001-SA P4B0481	2468-001-SA P4B0481	2468-001-SA P4B0481	Primary Screening Level				
				HA43A-2.0	HA42A-2.0	GP314AA-1.5					
				Sample Date	Result	Flag	Result	Flag	Result	Flag	Result
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	5,970			2,310		1,680		85
	1,2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	1,890			673		489		85
	1,2,3,4,7,8,9-HxCDF	ng/kg	EPA 8290	216			109		65.5		85
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	80.9			90		15.9		0.34
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	729			512		181		0.34
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	315			222		82		0.34
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	391			180		91.2		0.34
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	160			109		35.9		0.34
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	149			78		40.3		0.34
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	65.5			68		13		0.034
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	349			148		78.2		0.31
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	564			110		130		0.34
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	807			139		171		0.0037
	2,3,7,8-TCDD	ng/kg	EPA 8290	17.1			5.2		4.44		0.0011
	2,3,7,8-TCDF	ng/kg	EPA 8290	730			108		198		0.094
	OCDD	ng/kg	EPA 8290	56,500			12,400		16,400		2,800
	OCDF	ng/kg	EPA 8290	2,690			562		806		2,800
	Total HpCDD	ng/kg	EPA 8290	--			--		--		--
	Total HpCDF	ng/kg	EPA 8290	--			--		--		--
	Total HxCDD	ng/kg	EPA 8290	--			--		--		--
	Total HxCDF	ng/kg	EPA 8290	--			--		--		--
	Total PeCDD	ng/kg	EPA 8290	--			--		--		--
	Total PeCDF	ng/kg	EPA 8290	--			--		--		--
	Total TCDD	ng/kg	EPA 8290	--			--		--		0.0011
	Total TCDF	ng/kg	EPA 8290	--			--		--		--

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level
7. Primary screening level is lowest relevant JSCS (Table 3.1) screening level value or draft Preliminary Remediation Goal.

Appendix B

Screening Level Values

Table B-1

Screening Table - In-Water Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶		EPA DRAFT Sediment PRGs ⁷			Screening Level ⁸	Carcinogen (c) or non-carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{9,10}
		HH Fish Consumption (17.5 g/day)	HH Fish Consumption (142 g/day)	RAO 1 Beach	RAO 1 Sediment	RAO 2 Sediment				
Inorganics (mg/kg)										
Mercury	0.07	0.07	0.07	--	--	--	0.07	nc	10	Bkgd
Arsenic	7	7	7	3	3	--	3	c	100	Bkgd
Barium	--	--	--	--	--	--	--	--	--	--
Chromium	--	--	--	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--	--	--	--
Lead	17	17	17	--	--	--	17	nc	10	Bkgd
Manganese	--	--	--	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--	--	--	--
Selenium	2	2	2	--	--	--	2	nc	10	Bkgd
Silver	--	--	--	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--	--	--	--
Beryllium	--	--	--	--	--	--	--	--	--	--
Cadmium	1	1	1	--	--	--	1	c	100	Bkgd
Thallium	--	--	--	--	--	--	--	--	--	--
PCBs (µg/kg)										
Aroclor 1016	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	--	--	--	--	--	--	--	--	--	--
Total PCBs	0.39	0.33	0.041	--	370	6	0.041	nc	10	0.41
PAHs (µg/kg)										
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--
Acenaphthene	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	--	--	--	--	--	--	--	--	--	--
Anthracene	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluranthene	--	--	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	510,000	62,000	--	--	--	62,000	nc	10	620,000
Fluorene	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	--	--	--	--	--	--	--	--	--
Pyrene	--	380,000	47,000	--	--	--	47,000	nc	10	470,000
LPAHs	--	--	--	--	--	--	--	--	--	--
HPAHs	--	--	--	--	--	--	--	--	--	--
Total PAHs	--	--	--	--	--	--	--	--	--	--
BaP Eq	--	--	--	12	106	4,000	12	--	--	--

Please refer to notes at end of table.

Table B-1

Screening Table - In-Water Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶		EPA DRAFT Sediment PRGs ⁷			Screening Level ⁸	Carcinogen (c) or non-carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{9,10}
		HH Fish Consumption (17.5 g/day)	HH Fish Consumption (142 g/day)	RAO 1 Beach	RAO 1 Sediment	RAO 2 Sediment				
SVOCs (µg/kg)										
1,2,4-Trichlorobenzene	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--	--
3,4-Methylphenol	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--	--	--
4-Bromophenylether	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	--	--	--	--	--	--	--	--	--	--
4-Chlorophenylphenylether	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	--	--	--	--	--	--	--	--	--	--
Benzyl Alcohol	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy)methane	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl)ether	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	19	19	2.3	--	--	--	2.3	c	100	230
Hexachlorobutadiene	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	--	--	--	--	--	--	--	--	--	--
Isophorone	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	250	250	30	--	--	--	30	c	100	3,000
Phenol	--	--	--	--	--	--	--	--	--	--
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--
Butylbenzyl phthalate	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-1

Screening Table - In-Water Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶		EPA DRAFT Sediment PRGs ⁷			Screening Level ⁸	Carcinogen (c) or non-carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{9,10}
		HH Fish Consumption (17.5 g/day)	HH Fish Consumption (142 g/day)	RAO 1 Beach	RAO 1 Sediment	RAO 2 Sediment				
Organotins (µg/kg)										
Dibutyltin	--	--	--	--	--	--	--	--	--	--
Monobutyltin	--	--	--	--	--	--	--	--	--	--
Tetra-n-butyltin	--	--	--	--	--	--	--	--	--	--
Tributyltin	--	85	10	--	--	--	10	nc	10	100
Dioxins/Furans (ng/kg)										
1,2,3,4,6,7,8-HpCDD	690	690	85	--	--	--	85	c	100	8,500
1,2,3,4,6,7,8-HpCDF	690	690	85	--	--	--	85	c	100	8,500
1,2,3,4,7,8,9-HpCDF	690	690	85	--	--	--	85	c	100	8,500
1,2,3,4,7,8-HxCDD	--	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,4,7,8-HxCDF	2.7	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,6,7,8-HxCDD	--	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,6,7,8-HxCDF	2.7	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,7,8,9-HxCDD	--	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,7,8,9-HxCDF	2.7	2.7	0.34	--	--	--	0.34	c	100	34
1,2,3,7,8-PeCDD	2.6	0.27	0.034	--	--	--	0.03	c	100	3
1,2,3,7,8-PeCDF	2.6	2.6	0.31	--	--	--	0.31	c	100	31
2,3,4,6,7,8-HxCDF	2.7	2.7	0.34	--	--	--	0.34	c	100	34
2,3,4,7,8-PeCDF	0.03	0.030	0.0037	--	--	--	0.0037	c	100	0.37
2,3,7,8-TCDD	0.0091	0.0091	0.0011	--	--	--	0.0011	c	100	0.11
2,3,7,8-TCDF	0.77	0.77	0.094	--	--	--	0.094	c	100	9.4
OCDD	23,000	23,000	2,800	--	--	--	2,800	c	100	280,000
OCDF	23,000	23,000	2,800	--	--	--	2,800	c	100	280,000
Total HpCDD	--	--	--	--	--	--	--	--	--	--
Total HpCDF	--	--	--	--	--	--	--	--	--	--
Total HxCDD	--	--	--	--	--	--	--	--	--	--
Total HxCDF	--	--	--	--	--	--	--	--	--	--
Total PeCDD	--	--	--	--	--	--	--	--	--	--
Total PeCDF	--	--	--	--	--	--	--	--	--	--
Total TCDD (TEQ)	--	0.0091	0.0011	--	10	0.03	0.0011	--	--	--
Total TCDF	--	--	--	--	--	--	--	--	--	--

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. µg/kg = micrograms per kilogram

4. ng/kg = nanograms per kilogram

5. Portland Harbor Joint Source Control Strategy: Table 3-1, revision date 7/16/07. Ecological receptor-based screening levels not included.

6. Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Tables A-1a and A-1b, DEQ, January 2007

7. Portland Harbor draft sediment preliminary remediation goals as produced by EPA, 4/11/2014.

8. Screening level is lowest of screening levels listed, but not less than default background.

9. Hot spot level is lowest of screening levels listed multiplied by 10 for non-carcinogen analytes and 100 for carcinogens.

10. Bkgd - Screening level is default background: no risk based screening level so hot spot level not applicable.

Table B-2

Screening Table - In-Water Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶				EPA Current DRAFT Sediment PRGs ⁷		Screening Level ⁸	Preliminary Hot Spot Level ^{9,10}
		Benthic	Fish	Birds	Mammals	RAO 5 Ingestion	RAO 6 Dietary		
Inorganics (mg/kg)									
Mercury	0.07	--	0.07	0.07	0.07	--	--	0.07	Bkgd
Arsenic	7	17	7	7	7	--	--	7	170
Barium	--	--	--	--	--	--	--	--	--
Chromium	111	90	--	--	--	90	--	90	900
Copper	149	149	--	--	--	165	--	149	1,490
Lead	17	91.3	17	17	17	96	--	17	913
Manganese	1,100	1,100	--	--	--	--	--	1,100	11,000
Nickel	48.6	36	--	--	--	--	--	36	486
Selenium	2	--	2	2	2	--	--	2	Bkgd
Silver	5	--	--	--	--	--	--	5	50
Zinc	459	315	--	--	--	315	--	315	3,150
Antimony	64	--	--	--	--	--	--	64	640
Beryllium	--	--	--	--	--	--	--	--	--
Cadmium	4.98	3.5	1	1	1	3.5	--	1	35
Thallium	--	--	--	--	--	--	--	--	--
PCBs (µg/kg)									
Aroclor 1016	530	--	--	--	--	--	--	530	5,300
Aroclor 1221	--	--	--	--	--	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	--	--	--
Aroclor 1242	--	--	--	--	--	--	--	--	--
Aroclor 1248	1,500	--	--	--	--	--	--	1,500	15,000
Aroclor 1254	300	--	--	--	--	--	--	300	3,000
Aroclor 1260	200	--	--	--	--	--	--	200	2,000
Aroclor 1262	--	--	--	--	--	--	--	--	--
Aroclor 1268	--	--	--	--	--	--	--	--	--
Total PCBs	--	277	22	91	84	126	40	22	220
PAHs (µg/kg)									
2-Methylnaphthalene	200	--	--	--	--	--	--	200	2,000
Acenaphthene	300	1,400	--	--	--	--	--	300	3,000
Acenaphthylene	200	--	--	--	--	--	--	200	2,000
Anthracene	845	1,400	--	--	--	--	--	845	8,450
Benzo(a)anthracene	1,050	6,700	--	--	--	--	--	1,050	10,500
Benzo(a)pyrene	1,450	6,700	--	--	--	--	--	1,450	14,500
Benzo(b)fluoranthene	--	6,700	--	--	--	--	--	6,700	67,000
Benzo(ghi)perylene	300	--	--	--	--	--	--	300	3,000
Benzo(k)fluranthene	13,000	6,700	--	--	--	--	--	6,700	67,000
Chrysene	1,290	--	--	--	--	--	--	1,290	12,900
Dibeno(a,h)anthracene	1,300	6,700	--	--	--	--	--	1,300	13,000
Fluoranthene	2,230	6,700	37,000	--	360,000	--	--	2,230	22,300
Fluorene	536	1,400	--	--	--	--	--	536	5,360
Indeno(1,2,3-cd)pyrene	100	6,700	--	--	--	--	--	100	1,000
Naphthalene	561	1,400	--	--	--	--	--	561	5,610
Phenanthrene	1,170	--	--	--	--	--	--	1,170	11,700
Pyrene	1,520	6,700	2,000	--	18,000,000	--	--	1,520	15,200
LPAHs	--	1,400	--	--	--	1,600	--	1,400	--
HPAHs	--	6,700	--	--	--	150,000	--	6,700	--
Total PAHs	--	22,800	--	--	--	23,000	--	22,800	--
BaP Eq	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-2

Screening Table - In-Water Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶				EPA Current DRAFT Sediment PRGs ⁷		Screening Level ⁸	Preliminary Hot Spot Level ^{9,10}
		Benthic	Fish	Birds	Mammals	RAO 5 Ingestion	RAO 6 Dietary		
SVOCs (µg/kg)									
1,2,4-Trichlorobenzene	9,200	--	--	--	--	--	--	9,200	92,000
1,2-Dichlorobenzene	1,700	--	--	--	--	--	--	1,700	17,000
1,3-Dichlorobenzene	300	--	--	--	--	--	--	300	3,000
1,4-Dichlorobenzene	300	--	--	--	--	--	--	300	3,000
2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	--	--	--	--	--	--	--	--	--
2-Chlorophenol	--	--	--	--	--	--	--	--	--
2-Methylphenol	--	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	--	--	--	--	--
2-Nitrophenol	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--
3,4-Methylphenol	--	--	--	--	--	--	--	--	--
3-Nitroaniline	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--	--
4-Bromophenylether	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	--	--	--	--	--
4-Chloroaniline	--	--	--	--	--	--	--	--	--
4-Chlorophenylphenylether	--	--	--	--	--	--	--	--	--
4-Nitroaniline	--	--	--	--	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--	--	--	--
Benzoic Acid	--	--	--	--	--	--	--	--	--
Benzyl Alcohol	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy)methane	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl)ether	--	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	--	--	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	--	--	61,000	--	--	--	--	61,000	610,000
Hexachlorobutadiene	600	--	--	--	--	--	--	600	6,000
Hexachlorocyclopentadiene	400	--	--	--	--	--	--	400	4,000
Hexachloroethane	--	--	--	--	--	--	--	--	--
Isophorone	--	--	--	--	--	--	--	--	--
Nitrobenzene	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	--	--	--	--	--	--	--
Pentachlorophenol	--	--	310	--	330	--	--	310	3,100
Phenol	--	--	--	--	--	--	--	--	--
Phthalates (µg/kg)									
Bis(2-ethylhexyl)phthalate	--	750,000	--	--	--	148,000	--	148,000	1,480,000
Butylbenzyl phthalate	--	--	--	--	--	--	--	--	--
Diethyl phthalate	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-2

Screening Table - In-Water Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	JSCS Screening Level ⁵	Sediment Bioaccumulation SLVs ⁶				EPA Current DRAFT Sediment PRGs ⁷		Screening Level ⁸	Preliminary Hot Spot Level ^{9,10}
		Benthic	Fish	Birds	Mammals	RAO 5 Ingestion	RAO 6 Dietary		
Organotins (µg/kg)									
Dibutyltin	--	--	--	--	--	--	--	--	--
Monobutyltin	--	--	--	--	--	--	--	--	--
Tetra-n-butyltin	--	--	--	--	--	--	--	--	--
Tributyltin	2.3	351	2.3	4,100	1,100	4,000	--	2.3	23
Dioxins/Furans (ng/kg)									
1,2,3,4,6,7,8-HxCDD	--	--	430,000	530,000	3900	--	--	3,900	39,000
1,2,3,4,6,7,8-HxCDF	--	--	4300	53,000	3900	--	--	3,900	39,000
1,2,3,4,7,8,9-HxCDF	--	--	43,000	53,000	3900	--	--	3,900	39,000
1,2,3,4,7,8-HxCDD	--	--	34	420	15	--	--	15	150
1,2,3,4,7,8-HxCDF	--	--	170	210	15	--	--	15	150
1,2,3,6,7,8-HxCDD	--	--	1700	2100	15	--	--	15	150
1,2,3,6,7,8-HxCDF	--	--	170	210	15	--	--	15	150
1,2,3,7,8,9-HxCDD	--	--	1700	210	15	--	--	15	150
1,2,3,7,8,9-HxCDF	--	--	170	210	15	--	--	15	150
1,2,3,7,8-PeCDD	--	--	17	21	1.5	--	--	1.5	15
1,2,3,7,8-PeCDF	--	--	950	59	14	--	--	14	140
2,3,4,6,7,8-HxCDF	--	--	170	210	15	--	--	15	150
2,3,4,7,8-PeCDF	--	9,000	1.1	3.5	4.7	--	--	1.1	11
2,3,7,8-TCDD	--	--	0.56	--	0.052	--	--	0.0520	0.520
2,3,7,8-TCDF	--	--	95	5.9	4.3	--	--	4.3	43
OCDD	--	--	4,300,000	5,300,000	130,000	--	--	130,000	1,300,000
OCDF	--	--	4,300,000	5,300,000	27,000,000	--	--	4,300,000	43,000,000
Total HpCDD	--	--	--	--	--	--	--	--	--
Total HpCDF	--	--	--	--	--	--	--	--	--
Total HxCDD	--	--	--	--	--	--	--	--	--
Total HxCDF	--	--	--	--	--	--	--	--	--
Total PeCDD	--	--	--	--	--	--	--	--	--
Total PeCDF	--	--	--	--	--	--	--	--	--
Total TCDD (TEQ)	--	--	--	--	--	--	54	54	--
Total TCDF	--	--	--	--	--	--	--	--	--

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. µg/kg = micrograms per kilogram

4. ng/kg = nanograms per kilogram

5. Portland Harbor Joint Source Control Strategy: Table 3-1, revision date 7/16/07

6. Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Tables A-1a and A-1b, DEQ, January 2007 from DEQ table]

7. Portland Harbor draft sediment preliminary remediation goals as produced by EPA, 4/11/2014

8. Screening level is lowest of screening levels listed, but not less than default background.

9. Hot spot level is lowest of screening levels listed multiplied by 10 (excluding background).

10. Bkgd - Screening level is default background; no risk based screening level so hot spot level not applicable.

Table B-3

Screening Table - Upland Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	DEQ Risk Based Concentrations ⁶			Screening Level ⁷	Carcinogen (c) or non-carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{8,9}
		RBCsso ⁶	RBCsscw ⁷	RBCssew ⁸				
Inorganics (mg/kg)								
Mercury	0.23	310	93	2,600	93	nc	10	930
Arsenic	8.8	1.7	13	370	8.8	c	100	170
Barium	790	190,000	60,000	--	60,000	nc	10	600,000
Chromium	76	--	460,000	--	460,000	nc	10	4,600,000
Copper	34	41,000	12,000	340,000	12,000	nc	10	120,000
Lead	79	800	800	800	800	nc	10	8,000
Manganese	1,800	23,000	7,200	200,000	7,200	nc	10	72,000
Nickel	47	20,000	6,100	170,000	6,100	nc	10	61,000
Selenium	0.71	--	--	--	--	--	--	--
Silver	0.82	5,100	1,500	43,000	1,500	nc	10	15,000
Zinc	180	--	--	--	--	--	--	--
Antimony	0.56	--	--	--	--	--	--	--
Beryllium	2	2,000	610	17,000	610	c	100	61,000
Cadmium	0.63	510	150	4,300	150	c	100	15,000
Thallium	5.2	--	--	--	--	--	--	--
PCBs (µg/kg)								
Aroclor 1016	--	--	--	--	--	--	--	--
Aroclor 1221	--	--	--	--	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	--	--
Aroclor 1242	--	--	--	--	--	--	--	--
Aroclor 1248	--	--	--	--	--	--	--	--
Aroclor 1254	--	--	--	--	--	--	--	--
Aroclor 1260	--	--	--	--	--	--	--	--
Aroclor 1262	--	--	--	--	--	--	--	--
Aroclor 1268	--	--	--	--	--	--	--	--
Total PCBs	--	560	4,400	120,000	560	c	100	56,000
PAHs (µg/kg)								
2-Methylnaphthalene	--	--	--	--	--	--	--	--
Acenaphthene	--	61,000,000	19,000,000	520,000,000	19,000,000	nc	10	190,000,000
Acenaphthylene	--	--	--	--	--	--	--	--
Anthracene	--	310,000,000	93,000,000	--	93,000,000	nc	10	930,000,000
Benzo(a)anthracene	--	2,700	21,000	590,000	2,700	c	100	270,000
Benzo(a)pyrene	--	270	2,100	59,000	270	c	100	27,000
Benzo(b)fluoranthene	--	2,700	21,000	590,000	2,700	c	100	270,000
Benzo(ghi)perylene	--	--	--	--	--	nc	10	--
Benzo(k)fluranthene	--	27,000	210,000	5,900,000	27,000	c	100	2,700,000
Chrysene	--	250,000	2,100,000	57,000,000	250,000	c	100	25,000,000
Dibenzo(a,h)anthracene	--	270	2,100	59,000	270	c	100	27,000
Fluoranthene	--	29,000,000	8,900,000	250,000,000	8,900,000	nc	10	89,000,000
Fluorene	--	41,000,000	12,000,000	340,000,000	12,000,000	nc	10	120,000,000
Indeno(1,2,3-cd)pyrene	--	2,700	21,000	590,000	2,700	c	100	270,000
Naphthalene	--	23,000	580,000	16,000,000	23,000	c	100	2,300,000
Phenanthrene	--	--	--	--	--	--	--	--
Pyrene	--	21,000,000	6,700,000	190,000,000	6,700,000	nc	10	67,000,000
LPAHs	--	--	--	--	--	--	--	--
HPAHs	--	--	--	--	--	--	--	--
Total PAHs	--	--	--	--	--	--	--	--
BaP Eq	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-3

Screening Table - Upland Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	DEQ Risk Based Concentrations ⁶			Screening Level ⁷	Carcinogen (c) or non- carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{8,9}
		RBCsso ⁶	RBCssc ⁷	RBCssew ⁸				
1,3-Dichlorobenzene	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	--	63,000	1,200,000	34,000,000	63,000	c	100	6,300,000
2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	--	200,000	240,000	6,600,000	200,000	c	100	20,000,000
2,4-Dichlorophenol	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	--	770,000	240,000	6,600,000	240,000	nc	10	2,400,000
2-Chloronaphthalene	--	--	--	--	--	--	--	--
2-Chlorophenol	--	--	--	--	--	--	--	--
2-Methylphenol	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	--	--	--	--
2-Nitrophenol	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--
3,4-Methylphenol	--	--	--	--	--	--	--	--
3-Nitroaniline	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--
4-Bromophenylether	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	--	--	--	--
4-Chloroaniline	--	--	--	--	--	--	--	--
4-Chlorophenylphenylether	--	--	--	--	--	--	--	--
4-Nitroaniline	--	--	--	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--	--	--
Benzoic Acid	--	--	--	--	--	--	--	--
Benzyl Alcohol	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	--	--	--	--	--	--	--	--
Bis(2-chloroethyl)ether	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	--	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	--	--	--	--
Hexachlorobenzene	--	1,200	12,000	330,000	1,200	c	100	120,000
Hexachlorobutadiene	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--
Hexachloroethane	--	66,000	90,000	240,000	66,000	c	100	6,600,000
Isophorone	--	--	--	--	--	--	--	--
Nitrobenzene	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	--	--	--	--	--	--
Pentachlorophenol	--	3,900	31,000	860,000	3,900	c	100	390,000
Phenol	--	--	--	--	--	nc	10	--

Please refer to notes at end of table.

Table B-3

Screening Table - Upland Human Health

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	DEQ Risk Based Concentrations ⁶			Screening Level ⁷	Carcinogen (c) or non-carcinogen (nc)	Hot Spot Multiplier	Preliminary Hot Spot Level ^{8,9}
		RBCsso ⁶	RBCssc ⁷	RBCssew ⁸				
Diethyl phthalate	--	--	--	--	--	--	--	--
Dimethyl phthalate	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	--	--	--	--	--	--
Organotins (µg/kg)								
Dibutyltin	--	--	--	--	--	--	--	--
Monobutyltin	--	--	--	--	--	--	--	--
Tetra-n-butyltin	--	--	--	--	--	--	--	--
Tributyltin	--	--	--	--	--	--	--	--
Dioxins/Furans (ng/kg)								
1,2,3,4,6,7,8-HpCDD	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	--	15	150	4200	15	c	100	1,500
2,3,7,8-TCDF	--	--	--	--	--	--	--	--
OCDD	--	--	--	--	--	--	--	--
OCDF	--	--	--	--	--	--	--	--
Total HpCDD	--	--	--	--	--	--	--	--
Total HpCDF	--	--	--	--	--	--	--	--
Total HxCDD	--	--	--	--	--	--	--	--
Total HxCDF	--	--	--	--	--	--	--	--
Total PeCDD	--	--	--	--	--	--	--	--
Total PeCDF	--	--	--	--	--	--	--	--
Total TCDD (TEQ)	--	15	150	4200	15	--	--	--
Total TCDF	--	--	--	--	--	--	--	--

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. µg/kg = micrograms per kilogram

4. ng/kg = nanograms per kilogram

5. DEQ, 2013. Development of Oregon Background Metals Concentration in Soil. March 2013.

6. DEQ Risk-Based Concentrations Spreadsheet, June 2012

RBCsso = DEQ Risk-Based Concentrations for Occupational Workers, Direct Contact

RBCssc = DEQ Risk-Based Concentrations for Construction Workers, Direct Contact

RBCssew = DEQ Risk-Based Concentrations for Excavation Workers, Direct Contact

7. Screening level is lowest of screening levels listed, but not less than default background.

8. Hot spot level is lowest of screening levels listed multiplied by 10 for non-carcinogen analytes and 100 for carcinogens.

9. Bkgd - Screening level is default background; no risk based screening level so hot spot level not applicable.

Table B-4

Screening Table - Terrestrial Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	Ecological Risk Assessment SLV ⁶				Screening Level ⁷	Preliminary Hot Spot Level ⁸
		Plants	Invertebrates	Birds	Mammals		
Inorganics (mg/kg)							
Mercury	0.23	0.3	0.1	0.125	20	0.23	1
Arsenic	8.8	10	60	215	230	10	100
Barium	790	500	3,000	85	638	790	850
Chromium	76	1	0.4	130	170	76	1,300
Copper	34	100	50	140	245	50	500
Lead	79	50	500	55	280	79	500
Manganese	1,800	500	100	21,500	20,000	1,800	5,000
Nickel	47	30	200	1,050	650	47	300
Selenium	0.71	1	70	2	25	1	10
Silver	0.82	2	50	--	--	2	20
Zinc	180	50	200	230	395	180	500
Antimony	0.56	5	--	--	15	5	50
Beryllium	2	10	--	--	83	10	100
Cadmium	0.63	4	20	6	125	4	40
Thallium	5.2	1	--	--	1	5	10
PCBs (µg/kg)							
Aroclor 1016	--	--	--	--	100,000	100,000	1,000,000
Aroclor 1221	--	--	--	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	--
Aroclor 1242	--	--	--	1,500	5,000	1,500	15,000
Aroclor 1248	--	--	--	--	--	--	--
Aroclor 1254	--	--	--	700	4,000	700	7,000
Aroclor 1260	--	--	--	--	--	--	--
Aroclor 1262	--	--	--	--	--	--	--
Aroclor 1268	--	--	--	--	--	--	--
Total PCBs	--	40,000	--	655	371	371	3,710
PAHs (µg/kg)							
2-Methylnaphthalene	--	--	--	--	--	--	--
Acenaphthene	--	20,000	29,000	--	500,000	20,000	200,000
Acenaphthylene	--	--	--	--	--	--	--
Anthracene	--	--	29,000	--	500,000	29,000	290,000
Benzo(a)anthracene	--	--	18,000	--	5,500	5,500	55,000
Benzo(a)pyrene	--	--	18,000	--	5,500	5,500	55,000
Benzo(b)fluoranthene	--	--	18,000	--	5,500	5,500	55,000
Benzo(ghi)perylene	--	--	--	--	--	--	--
Benzo(k)fluranthene	--	--	18,000	--	5,500	5,500	55,000
Chrysene	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	--	--	18,000	--	5,500	5,500	55,000
Fluoranthene	--	--	18,000	--	5,500	5,500	55,000
Fluorene	--	--	29,000	--	500,000	29,000	290,000
Indeno(1,2,3-cd)pyrene	--	--	18,000	--	5,500	5,500	55,000
Naphthalene	--	10,000	29,000	--	500,000	10,000	100,000
Phenanthrene	--	--	--	--	--	--	--
Pyrene	--	--	18,000	--	5,500	5,500	55,000
LPAHs	--	--	29,000	--	500,000	29,000	--
HPAHs	--	--	18,000	--	5,500	5,500	--
Total PAHs	--	--	--	--	--	--	--
BaP Eq	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-4

Screening Table - Terrestrial Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	Ecological Risk Assessment SLV ⁶				Screening Level ⁷	Preliminary Hot Spot Level ⁸
		Plants	Invertebrates	Birds	Mammals		
SVOCs ($\mu\text{g/kg}$)							
1,2,4-Trichlorobenzene	--	--	20,000	--	--	20,000	200,000
1,2-Dichlorobenzene	--	--	--	--	--	--	--
1,3-Dichlorobenzene	--	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	20,000	--	--	20,000	200,000
2,4,5-Trichlorophenol	--	4,000	9,000	--	--	4,000	40,000
2,4,6-Trichlorophenol	--	10,000	10,000	--	--	10,000	100,000
2,4-Dichlorophenol	--	20,000	--	--	--	20,000	200,000
2,4-Dimethylphenol	--	20,000	--	--	--	20,000	200,000
2,4-Dinitrophenol	--	20,000	--	--	--	20,000	200,000
2,4-Dinitrotoluene	--	--	--	--	--	--	--
2,6-Dinitrotoluene	--	--	--	--	--	--	--
2-Chloronaphthalene	--	--	--	--	--	--	--
2-Chlorophenol	--	60,000	--	--	--	60,000	600,000
2-Methylphenol	--	50,000	--	--	--	50,000	500,000
2-Nitroaniline	--	--	--	--	--	--	--
2-Nitrophenol	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	--	--	--	--	--	--	--
3,4-Methylphenol	--	--	--	--	--	--	--
3-Nitroaniline	--	70,000	--	--	--	70,000	700,000
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--
4-Bromophenylether	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	--	--	--
4-Chloroaniline	--	40,000	--	--	--	40,000	400,000
4-Chlorophenylphenylether	--	--	--	--	--	--	--
4-Nitroaniline	--	40,000	--	--	--	40,000	400,000
4-Nitrophenol	--	10,000	7,000	--	--	7,000	70,000
Benzoic Acid	--	--	--	--	--	--	--
Benzyl Alcohol	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	--	--	--	--	--	--	--
Bis(2-chloroethyl)ether	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	2	2	20
Hexachlorobenzene	--	--	1,000,000	--	--	1,000,000	10,000,000
Hexachlorobutadiene	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	--	10,000	--	--	--	10,000	100,000
Hexachloroethane	--	--	--	--	--	--	--
Isophorone	--	--	--	--	--	--	--
Nitrobenzene	--	8,000	40,000	--	--	8,000	80,000
N-Nitrosodi-n-propylamine	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	--	--	20,000	--	--	20,000	200,000
Pentachlorophenol	--	3,000	4,000	--	--	3,000	30,000
Phenol	--	70,000	30,000	--	--	30,000	300,000

Please refer to notes at end of table.

Table B-4

Screening Table - Terrestrial Ecological

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Constituent	DEQ Default Soil Background ⁵	Ecological Risk Assessment SLV ⁶				Screening Level ⁷	Preliminary Hot Spot Level ⁸
		Plants	Invertebrates	Birds	Mammals		
Phthalates (µg/kg)							
Bis(2-ethylhexyl)phthalate	--	--	--	22,500	5,100,000	22,500	225,000
Butylbenzyl phthalate	--	--	--	--	--	--	--
Diethyl phthalate	--	100,000	--	--	--	100,000	1,000,000
Dimethyl phthalate	--	--	200,000	--	--	200,000	2,000,000
Di-n-butyl phthalate	--	200,000	--	--	--	200,000	2,000,000
Di-n-octyl phthalate	--	--	--	--	--	--	--
Organotins (µg/kg)							
Dibutyltin	--	--	--	--	--	--	--
Monobutyltin	--	--	--	--	--	--	--
Tetra-n-butyltin	--	--	--	--	--	--	--
Tributyltin	--	--	--	140,000	6,500,000	140,000	1,400,000
Dioxins/Furans (ng/kg)							
1,2,3,4,6,7,8-HxCDD	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HxCDF	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HxCDF	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	--	--	--	16	5.67	5.67	57
2,3,7,8-TCDD	--	--	--	--	--	--	--
2,3,7,8-TCDF	--	--	--	--	--	--	--
OCDD	--	--	--	--	--	--	--
OCDF	--	--	--	--	--	--	--
Total HpCDD	--	--	--	--	--	--	--
Total HpCDF	--	--	--	--	--	--	--
Total HxCDD	--	--	--	--	--	--	--
Total HxCDF	--	--	--	--	--	--	--
Total PeCDD	--	--	--	--	--	--	--
Total PeCDF	--	--	--	--	--	--	--
Total TCDD (TEQ)	--	--	--	21.7	2.31	2.31	--
Total TCDF	--	--	--	--	--	--	--

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. µg/kg = micrograms per kilogram

4. ng/kg = nanograms per kilogram

5. DEQ, 2013. Development of Oregon Background Metals Concentration in Soil. March 2013.

6. Guidance for Ecological Risk Assessment, Table 1, DEQ, December 2001

7. Screening level is lowest of screening levels listed, but not less than default background.

8. Hot spot level is the lowest potential screening level multiplied by 10 that results in a hot spot level greater than background.

9. LPAHs = Low-molecular-weight PAHs

10. HPAHs = High-molecular-weight PAHs

11. BaP Eq = Total benzo(a)pyrene equivalent (toxic equivalent)

Appendix C
Screening Tables

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
Sample Date				10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010								
Depth (Feet Below Ground Surface)				0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	0.413		0.317		0.0133	J	0.0616	J	0.0449	J	1.18		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	143	J	14.1		12.7		11.8		12.7		27.4		3	Bkgd
	Barium	mg/kg	EPA 6020	246		273		391		218		216		281		--	--
	Chromium	mg/kg	EPA 6020	407		82.3		31.6		29.6		26.6		183		--	--
	Copper	mg/kg	EPA 6020	568		123		37.3		34.2		32.1		587		--	--
	Lead	mg/kg	EPA 6020	898		224		895		27.8		27.4		738		17	Bkgd
	Manganese	mg/kg	EPA 6020	915		670		543		819		969		1650		--	--
	Nickel	mg/kg	EPA 6020	228		51.0		24.4		26.0		26.0		176		--	--
	Selenium	mg/kg	EPA 6020	0.398	J	0.266	J	0.488	J	0.0627	J	0.0131	U	0.362	J	2	Bkgd
	Silver	mg/kg	EPA 6020	2.83		0.357	J	4.09		0.220	J	0.262	J	0.795		--	--
	Zinc	mg/kg	EPA 6020	2700		320		488		115		98.9		1520		--	--
	Antimony	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	--	--	--	--	
	Cadmium	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	--	--	100	Bkgd	

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100610-3-3.6-25-06 DUP	100710-3-3.7-Surface -11FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/6/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	20 - 25	0							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	0.175	J	0.176		0.102		0.0262	J	0.0770	J	5.71		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	9.40		4.37		8.42		2.37	J	2.41	J	29.1		3	Bkgd
	Barium	mg/kg	EPA 6020	202	J	149		218		68.6		113		458		--	--
	Chromium	mg/kg	EPA 6020	220	J	446		38.2		16.5		18.9		279		--	--
	Copper	mg/kg	EPA 6020	109	J	53.1		100		16.3		18.4		1840		--	--
	Lead	mg/kg	EPA 6020	772		267		416		3.92		4.87	J	1780		17	Bkgd
	Manganese	mg/kg	EPA 6020	2110		2850		527		267		248		1940		--	--
	Nickel	mg/kg	EPA 6020	92.0		263		38.1		19.5		22.1		447		--	--
	Selenium	mg/kg	EPA 6020	5.76		2.29		0.239	J	0.0109	U	0.0117	U	0.697	J	2	Bkgd
	Silver	mg/kg	EPA 6020	0.766		0.630		0.311	J	0.0544	J	0.0587	J	5.45		--	--
	Zinc	mg/kg	EPA 6020	473		212		513		52.6		58.6		5510		--	--
	Antimony	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	--	--	--	--	
	Cadmium	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	--	--	100	Bkgd	

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	Screening Level	Preliminary Hot Spot Concentration		
Sample Date				10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010	10/7/2010				
Depth (Feet Below Ground Surface)				0 - 5	0	0 - 5	0	0 - 5	0				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	1.92	J	1.82		0.963		1.27		3.24	
	Arsenic	mg/kg	EPA 6020	7.95		21.3		18.5		19.3		18.5	6.61
	Barium	mg/kg	EPA 6020	118		343		292		188		328	206
	Chromium	mg/kg	EPA 6020	69.1		132		193		185		281	61.5
	Copper	mg/kg	EPA 6020	500		13300		536		724		1740	120
	Lead	mg/kg	EPA 6020	331		1860		2430		617		988	187
	Manganese	mg/kg	EPA 6020	518		1150		1450		1640		2970	1320
	Nickel	mg/kg	EPA 6020	98.2		235		287		192		248	39.6
	Selenium	mg/kg	EPA 6020	0.133	J	1.78	J	0.611	J	0.126		1.23	0.107
	Silver	mg/kg	EPA 6020	0.374	J	3.22		0.750	J	0.680		4.89	0.240
	Zinc	mg/kg	EPA 6020	463		4800		1890		1440		1810	617
	Antimony	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	--
	Cadmium	mg/kg	EPA 602	--	--	--	--	--	--	--	--	--	100

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration		
Sample Date				10/7/2010	10/7/2010				
Depth (Feet Below Ground Surface)				0 - 5	5 - 10				
				Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.115	J	0.393		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	3.34		2.87		3	Bkgd
	Barium	mg/kg	EPA 6020	95.5		97.0		--	--
	Chromium	mg/kg	EPA 6020	19.3		18.8		--	--
	Copper	mg/kg	EPA 6020	31.9		20.3		--	--
	Lead	mg/kg	EPA 6020	26.8		8.93		17	Bkgd
	Manganese	mg/kg	EPA 6020	340		289		--	--
	Nickel	mg/kg	EPA 6020	17.4		19.6		--	--
	Selenium	mg/kg	EPA 6020	0.296	J	0.0113	U	2	Bkgd
	Silver	mg/kg	EPA 6020	0.196	J	0.141	J	--	--
	Zinc	mg/kg	EPA 6020	80.7		59.8		--	--
	Antimony	mg/kg	EPA 602	--	--	--	--	--	--
	Cadmium	mg/kg	EPA 602	--	--	--	--	100	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/19/2003	12/19/2003	12/19/2003	12/19/2003		12/19/2003			
				Depth (Feet Below Ground Surface)	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.189			0.089		ND	U	0.3080		0.2650	
	Arsenic	mg/kg	EPA 6020	28.8			7.37		3.7		43.2		43.3	3
	Barium	mg/kg	EPA 6020	364			115		57		260		201	--
	Chromium	mg/kg	EPA 6020	47.6			ND		31.7		119.0		80.5	--
	Copper	mg/kg	EPA 6020	264			102		37.3		768.0		637.0	--
	Lead	mg/kg	EPA 6020	561			114		100		673.0		398.0	17
	Manganese	mg/kg	EPA 6020	1430			833		698		1440		1330	--
	Nickel	mg/kg	EPA 6020	74.1			111		150.0		244.0		126.0	--
	Selenium	mg/kg	EPA 6020	0.505			ND	U	ND	U	0.6360		0.5060	2
	Silver	mg/kg	EPA 6020	ND	U		ND	U	ND	U	0.518		0.529	--
	Zinc	mg/kg	EPA 6020	1010			234		175		1380		1190.0	--
	Antimony	mg/kg	EPA 602	9.87			1.46		0.931		21.9		10.1	--
	Cadmium	mg/kg	EPA 602	0.458			ND	U	ND	U	1.17		0.895	100

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	12/18/2003	12/18/2003	12/18/2003				
Depth (Feet Below Ground Surface)				0.5	2	0.5	2				
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.694		1		0.2600		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	6.35		8.22		8.4		3	Bkgd
	Barium	mg/kg	EPA 6020	160		196		157		--	--
	Chromium	mg/kg	EPA 6020	89.8		67.4		49.2		--	--
	Copper	mg/kg	EPA 6020	174		275		87.0		--	--
	Lead	mg/kg	EPA 6020	406		437		816		17	Bkgd
	Manganese	mg/kg	EPA 6020	1000		873		1020		297	--
	Nickel	mg/kg	EPA 6020	93.2		99.1		44.0		28.9	--
	Selenium	mg/kg	EPA 6020	ND	U	0.502		0.448		ND	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	0.522		ND	U	ND	--
	Zinc	mg/kg	EPA 6020	1560		1000		530		152	--
	Antimony	mg/kg	EPA 602	4.92		7.82		3.53		0.494	--
	Cadmium	mg/kg	EPA 602	ND	U	1.29		ND	U	ND	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Screening Level	Preliminary Hot Spot Concentration		
				Result	Flag	Result	Flag				
Sample Date		12/17/2003		12/17/2003		12/16/2003					
Depth (Feet Below Ground Surface)		0.5		2.5		2					
Inorganics	Mercury	mg/kg	EPA 7471A	0.307		0.427		3.42			
	Arsenic	mg/kg	EPA 6020	4.68		2.35		9.28			
	Barium	mg/kg	EPA 6020	188		181		188	--		
	Chromium	mg/kg	EPA 6020	35.3		21.1		57.7	--		
	Copper	mg/kg	EPA 6020	126		25.9		3340	--		
	Lead	mg/kg	EPA 6020	242		13.7		2950			
	Manganese	mg/kg	EPA 6020	310		303		645	--		
	Nickel	mg/kg	EPA 6020	43.6		24.1		1020	--		
	Selenium	mg/kg	EPA 6020	0.893		ND	U	0.579	2		
	Silver	mg/kg	EPA 6020	ND	U	ND	U	0.451	--		
	Zinc	mg/kg	EPA 6020	564		83.6		2450	--		
	Antimony	mg/kg	EPA 602	2.24		ND	U	167	--		
	Cadmium	mg/kg	EPA 602	0.857		ND	U	7.03	100		

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Screening Level	Preliminary Hot Spot Concentration				
				Sample Date	2/24/2004	2/24/2004	2/24/2004						
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5						
				Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	0.483		4.57		0.99		10.6		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	19.4		40.7		24.4		27		3	Bkgd
	Barium	mg/kg	EPA 6020	165		637		243		613		--	--
	Chromium	mg/kg	EPA 6020	142		464		194		259		--	--
	Copper	mg/kg	EPA 6020	333		1990		1370		1760		--	--
	Lead	mg/kg	EPA 6020	591		2650		1030		2950		17	Bkgd
	Manganese	mg/kg	EPA 6020	629		1860		2220		2330		--	--
	Nickel	mg/kg	EPA 6020	174		627		341		309		--	--
	Selenium	mg/kg	EPA 6020	0.878		0.831		ND		1.05		2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	2.09		0.781		1.93		--	--
	Zinc	mg/kg	EPA 6020	1290		9000		4220		5020		--	--
	Antimony	mg/kg	EPA 602	7.44		47		18		55.1		--	--
	Cadmium	mg/kg	EPA 602	6.29		26.7		9.3		18.7		100	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003	12/22/2003	12/22/2003			
				Depth (Feet Below Ground Surface)		0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.466		0.161		ND		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	3.51		1.72		5.74		3	Bkgd
	Barium	mg/kg	EPA 6020	140		104		135		--	--
	Chromium	mg/kg	EPA 6020	30.9		16.4		18.7		--	--
	Copper	mg/kg	EPA 6020	54.8		60		33.7		--	--
	Lead	mg/kg	EPA 6020	114		78.3		55.1		17	Bkgd
	Manganese	mg/kg	EPA 6020	427		390		567		--	--
	Nickel	mg/kg	EPA 6020	31.3		14.1		21.2		--	--
	Selenium	mg/kg	EPA 6020	0.529		ND	U	0.485		2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	--	--
	Zinc	mg/kg	EPA 6020	179		127		102		--	--
	Antimony	mg/kg	EPA 602	0.872		2.26		1.83		--	--
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	100	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003	12/22/2003	12/22/2003			
				Depth (Feet Below Ground Surface)		0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.24		ND		0.0686		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	5.29		2.44		2.48		3	Bkgd
	Barium	mg/kg	EPA 6020	165		107		53.3		--	--
	Chromium	mg/kg	EPA 6020	154		14.6		141		--	--
	Copper	mg/kg	EPA 6020	66.2		46.6		74.2		--	--
	Lead	mg/kg	EPA 6020	206		127		21.1		17	Bkgd
	Manganese	mg/kg	EPA 6020	1520		398		1440		--	--
	Nickel	mg/kg	EPA 6020	252		32.4		159		--	--
	Selenium	mg/kg	EPA 6020	1.15		ND	U	0.658		2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	--	--
	Zinc	mg/kg	EPA 6020	190		90		65.1		--	--
	Antimony	mg/kg	EPA 602	2.15		ND	U	ND	U	--	--
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	100	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004	2/24/2004		
Depth (Feet Below Ground Surface)				0.5	2.5	5			
Inorganics	Mercury	mg/kg	EPA 7471A	ND	U	2.08		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	15.3		20.2	4.17	3	Bkgd
	Barium	mg/kg	EPA 6020	192		210	67.3	--	--
	Chromium	mg/kg	EPA 6020	24.5		158	153	--	--
	Copper	mg/kg	EPA 6020	32.7		612	89	--	--
	Lead	mg/kg	EPA 6020	105		689	76.8	17	Bkgd
	Manganese	mg/kg	EPA 6020	1070		1710	2720	--	--
	Nickel	mg/kg	EPA 6020	20.1		188	385	--	--
	Selenium	mg/kg	EPA 6020	ND	U	1.79	1.3	2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	2.22	ND	--	--
	Zinc	mg/kg	EPA 6020	138		2100	130	--	--
	Antimony	mg/kg	EPA 602	ND	U	14.5	ND	--	--
	Cadmium	mg/kg	EPA 602	ND	U	4.69	ND	100	Bkgd

Please refer to notes at end of table.

Table C-1

Sediment Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003	12/22/2003	12/22/2003			
				Depth (Feet Below Ground Surface)		0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.19		ND	U	ND	U	0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	1.04		1.16		1.87		3	Bkgd
	Barium	mg/kg	EPA 6020	122		86.7		93.4		--	--
	Chromium	mg/kg	EPA 6020	9.79		11.6		13.1		--	--
	Copper	mg/kg	EPA 6020	30.5		18.9		16.9		--	--
	Lead	mg/kg	EPA 6020	22.1		7.17		5.4		17	Bkgd
	Manganese	mg/kg	EPA 6020	853		292		233		--	--
	Nickel	mg/kg	EPA 6020	8.89		15.7		17.9		--	--
	Selenium	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	--	--
	Zinc	mg/kg	EPA 6020	81.8		54		52.7		--	--
	Antimony	mg/kg	EPA 602	ND	U	ND	U	ND	U	--	--
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	100	Bkgd

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-2

Sediment Human Health Human Health - Surface Sample Metals Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	2.64		1.93		2.41		2.13		0.226		4.02		0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	11.1		48.2		32.1		25.3		9.60		61.4		3	Bkgd		
	Barium	mg/kg	EPA 6020	205		324		324		554		164		985		--	--		
	Chromium	mg/kg	EPA 6020	64.8		142		170		147		112		918		--	--		
	Copper	mg/kg	EPA 6020	268		892		872		142		88.9		2340		--	--		
	Lead	mg/kg	EPA 6020	518		1550		3200		3700		611		2990		17	Bkgd		
	Manganese	mg/kg	EPA 6020	811		1810		1840		1250		4310		3290		--	--		
	Nickel	mg/kg	EPA 6020	63.8	J	164		117		75.3		70.5		1590		--	--		
	Selenium	mg/kg	EPA 6020	0.205	J	0.732	J	0.978	J	0.207	J	0.199	J	0.971		2	Bkgd		
	Silver	mg/kg	EPA 6020	0.381	J	1.260	J	0.555	J	0.518	J	0.227	J	2.26		--	--		
	Zinc	mg/kg	EPA 6020	1000		7540		3740		1940		479		8820		--	--		

Please refer to notes at end of table.

Table C-2

Sediment Human Health Human Health - Surface Sample Metals Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	18.9		2.73		2.89		1.94		3.20		0.0907	J	0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	68.9		55.9		26.7		24.2		24.4		2.93		3	Bkgd		
	Barium	mg/kg	EPA 6020	788		214		561		449		328		111		--	--		
	Chromium	mg/kg	EPA 6020	569		353		284		222		249		23.5		--	--		
	Copper	mg/kg	EPA 6020	1740		2270		1710		1230		1170		24.3		--	--		
	Lead	mg/kg	EPA 6020	4160		2550		2160		1390		1500		11.3		17	Bkgd		
	Manganese	mg/kg	EPA 6020	2820		3170		1610		2220		2230		346		--	--		
	Nickel	mg/kg	EPA 6020	1040		356		388		241		251		23.3		--	--		
	Selenium	mg/kg	EPA 6020	0.642		28.1		0.563		0.398		0.0938		0.0564	J	2	Bkgd		
	Silver	mg/kg	EPA 6020	2.36		1.96		1.72		1.45		0.844		0.169	J	--	--		
	Zinc	mg/kg	EPA 6020	7110		7960		9470		4640		3380		83.8		--	--		

Please refer to notes at end of table.

Table C-2

Sediment Human Health Human Health - Surface Sample Metals Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.279		0.361		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	5.74		4.55		3	Bkgd
	Barium	mg/kg	EPA 6020	154		140		--	--
	Chromium	mg/kg	EPA 6020	30.6		27.8		--	--
	Copper	mg/kg	EPA 6020	43.9		34.3		--	--
	Lead	mg/kg	EPA 6020	114		22.7		17	Bkgd
	Manganese	mg/kg	EPA 6020	540		487		--	--
	Nickel	mg/kg	EPA 6020	29.3		26.5		--	--
	Selenium	mg/kg	EPA 6020	0.0119	U	0.0316	J	2	Bkgd
	Silver	mg/kg	EPA 6020	0.327	J	0.379	J	--	--
	Zinc	mg/kg	EPA 6020	200		112		--	--

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.

7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-3

Sediment Human Health - Composite Sample Metals Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS		101510-3-3.8-Composite-11-FS		101510-3-3.9-Composite-14-FS		Screening Level	Preliminary Hot Spot Concentration	
				Sample Date	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	8.38			3.36		3.21		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	37.9			25.7		28.5		3	Bkgd
	Barium	mg/kg	EPA 6020	758			462		415		--	--
	Chromium	mg/kg	EPA 6020	282			252		358		--	--
	Copper	mg/kg	EPA 6020	2010			893		941		--	--
	Lead	mg/kg	EPA 6020	2610			1980		2660		17	Bkgd
	Manganese	mg/kg	EPA 6020	2060			1650		2240		--	--
	Nickel	mg/kg	EPA 6020	507			255		342		--	--
	Selenium	mg/kg	EPA 6020	1.32	J		0.386	J	0.436	J	2	Bkgd
	Silver	mg/kg	EPA 6020	2.52	J		1.34	J	1.28	J	--	--
	Zinc	mg/kg	EPA 6020	7670			4270		4380		--	--

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.

7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-4

Sediment Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration							
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010		9/8/2010		
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15		0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
PCBs	Aroclor 1254	µg/kg	EPA 8082	97.1	U	39.5	J	30.0	J	4.14	J	2.24	U	2360		--	--	
	Aroclor 1260	µg/kg	EPA 8082	1020		4.02	U	4.16	U	2.15	U	2.24	U	197	U	--	--	
	Total PCBs	µg/kg	EPA 8082	1857		59.1	J	30.0	J	4.14	J	4.5	U	2360		0.041	0.41	

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration							
				Sample Date		9/8/2010		10/5/2010		10/6/2010		10/7/2010		10/7/2010		10/6/2010		
				Depth (Feet Below Ground Surface)		5 - 10		0 - 5		10 - 15		0		0 - 5		0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
PCBs	Aroclor 1254	µg/kg	EPA 8082	200		121	J	1.81	U	16100		1160		10000		--	--	
	Aroclor 1260	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	--	--	
	Total PCBs	µg/kg	EPA 8082	200		215	J	3.6	U	16100		1932		10000		0.041	0.41	

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag								
PCBs	Aroclor 1254	µg/kg	EPA 8082	373	U	14600	J	4840		84.6		49.1		1.93	U	--	--
	Aroclor 1260	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	2.07	J	--	--
	Total PCBs	µg/kg	EPA 8082	5710		14600	J	5758		84.6		59.7		2.07	J	0.041	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37		HA-38		Screening Level	Preliminary Hot Spot Concentration						
				100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS								
Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003							
Depth (Feet Below Ground Surface)		0.5		2.5		2.5 DUP		0.5							
		Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PCBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	380		250		2350		340		--	--
	Aroclor 1260	µg/kg	EPA 8082	78.9		128		84.6		614		218		--	--
	Total PCBs	µg/kg	EPA 8082	78.9		508		334.6		2964		558		0.041	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/18/2003	12/18/2003	12/18/2003	12/18/2003				
Depth (Feet Below Ground Surface)				0.5	2	0.5	2				
				Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	462		1230		ND	U	300	--
	Aroclor 1260	µg/kg	EPA 8082	214		411		463	U	92	--
	Total PCBs	µg/kg	EPA 8082	676		1641		463	U	0.041	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date	12/17/2003	12/17/2003	12/16/2003		
				Depth (Feet Below Ground Surface)	0.5	2.5	2		
				Result	Flag	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	332		ND	U	300	--
	Aroclor 1260	µg/kg	EPA 8082	330		ND	U	200	--
	Total PCBs	µg/kg	EPA 8082	662		ND	U	0.041	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	2/24/2004	2/24/2004	2/24/2004		
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5		
				Result	Flag	Result	Flag	Result	Flag
PCBs	Aroclor 1254	µg/kg	EPA 8082	281		7080		5170	
	Aroclor 1260	µg/kg	EPA 8082	153		3110		ND	U
	Total PCBs	µg/kg	EPA 8082	434		10,190		5170	24900
								6060	30960
									0.041
								--	--
								--	--
									0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration
Sample Date				12/22/2003	12/22/2003	12/22/2003			
Depth (Feet Below Ground Surface)				0.5	2.5	5			
				Result	Flag	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	122		ND	U	ND	U
	Aroclor 1260	µg/kg	EPA 8082	90.7		ND	U	ND	U
	Total PCBs	µg/kg	EPA 8082	213		ND		ND	
								0.041	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003	12/22/2003	12/22/2003				
				Depth (Feet Below Ground Surface)		0.5	2.5	5				
				Result		Flag	Result	Flag	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--	--
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--	--
	Total PCBs	µg/kg	EPA 8082	ND	ND	ND	ND	ND	ND	0.041	0.41	

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004	2/24/2004		
				Depth (Feet Below Ground Surface)		0.5	2.5		
				Result	Flag	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	4,920		6,090		ND	U
	Aroclor 1260	µg/kg	EPA 8082	1,150		1,300		ND	U
	Total PCBs	µg/kg	EPA 8082	6,070		7,390		--	0.41

Please refer to notes at end of table.

Table C-4

Sediment Human Health - Boring Sample PCBs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003	12/22/2003	12/22/2003	Depth (Feet Below Ground Surface)		0.5	2.5	5
				Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--	--	--
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--	--	--
	Total PCBs	µg/kg	EPA 8082	ND		ND		ND		0.041		0.41	

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-5

Sediment Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	660	J	3790		135	J	1070		52.2	J	11200		--	--		
	Aroclor 1260	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	--	--		
	Total PCBs	µg/kg	EPA 8082	966	J	4950	J	325	J	1584	J	98.4	J	14160	J	0.041	0.41		

Please refer to notes at end of table.

Table C-5

Sediment Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	24700	J	3920		11400		12000		24500		4.96		--	--		
	Aroclor 1260	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	2.67	J	--	--		
	Total PCBs	µg/kg	EPA 8082	31180	J	4940	J	15760	J	14310	J	28340	J	7.63	J	0.041	0.41		

Please refer to notes at end of table.

Table C-5

Sediment Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/15/2010		10/15/2010				
				Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	14.6		2.15	U	--	--		
	Aroclor 1260	µg/kg	EPA 8082	14.5		9.8		--	--		
	Total PCBs	µg/kg	EPA 8082	29.1		9.8		0.041	0.41		

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-6

Sediment Human Health - Composite Sample PCBs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
PCBs	Aroclor 1254	µg/kg	EPA 8082	14700		4780	J	--
	Aroclor 1260	µg/kg	EPA 8082	1030	U	394	U	--
	Total PCBs	µg/kg	EPA 8082	14700		4780	J	0.041
						17700	J	0.41

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010								
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	761		47.3	J	264		6.51	J	4.45	U	48.7	J	--	--
	Acenaphthene	µg/kg	EPA 8270M	249		19.7	U	800		15.1	J	4.45	U	26.5	J	--	--
	Acenaphthylene	µg/kg	EPA 8270M	535		19.7	U	1470		5.47	J	4.45	U	35.0	J	--	--
	Anthracene	µg/kg	EPA 8270M	694		19.7	U	4150		44.6		4.45	U	73.6	J	--	--
	Benz(a)anthracene	µg/kg	EPA 8270M	2460		62.0	J	8960		83.4		9.32	J	345		--	--
	Benz(a)pyrene	µg/kg	EPA 8270M	2700		97.1		8740		90.5		10.9	J	430		--	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2250		124		6270		61.6		11.7	J	472		--	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1710		94.1		6760		51.5		8.68	J	468		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	1950		69.6	J	5830		68.5		11.7	J	412		--	--
	Chrysene	µg/kg	EPA 8270M	2840		102		9990		97.1		17.9	J	475		--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	489		21.2	J	1480		16.2	J	4.45	U	113		--	--
	Fluoranthene	µg/kg	EPA 8270M	5710		107		18600		242		33.4		546		62,000	620,000
	Fluorene	µg/kg	EPA 8270M	457		19.7	U	1270		19.6		4.54	J	28.5	J	--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1400		65.9	J	5100		47.8		7.77	J	372		--	--
	Naphthalene	µg/kg	EPA 8270M	1020		52.7	J	308		20.5		4.45	U	65.6	J	--	--
	Phenanthrene	µg/kg	EPA 8270M	2380		80.1	J	18100		150		42.4		298		--	--
	Pyrene	µg/kg	EPA 8270M	5040		126		24200		268		37.7		577		47,000	470,000
	LPAHs	µg/kg	--	6,100		260		26,360		260		70		580		--	--
	HPAHs	µg/kg	--	26,550		870		95,930		1,030		150		4,210		--	--
	Total PAHs	µg/kg	--	32,650		1,130		122,290		1,290		220		4,790		--	--
	BaP Eq	µg/kg	--	3,840		150		12,390		130		20		670		12	--

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface-11FS	100710-3-3.7-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date		9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010						
				Depth (Feet Below Ground Surface)		5 - 10	10 - 15	0 - 5	10 - 15	0	0 - 5						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	386		54.3		27.8	J	3.52	U	77.6	J	20.2	J	--	--
	Acenaphthene	µg/kg	EPA 8270M	49.7	U	20.6	J	27.4	J	3.52	U	56.8	J	17.9	U	--	--
	Acenaphthylene	µg/kg	EPA 8270M	108	J	63.3		28.4	J	3.65	J	98.6	J	25.7	J	--	--
	Anthracene	µg/kg	EPA 8270M	153	J	61.9		54.1		3.52	U	406		38.4	J	--	--
	Benz(a)anthracene	µg/kg	EPA 8270M	1280		382		339		4.41	J	1270		144		--	--
	Benz(a)pyrene	µg/kg	EPA 8270M	2090		646		316		7.02	J	986		214		--	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2590		765		742		4.26	J	1020		204		--	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2960		811		388		6.16	J	1010		230		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	2010		672		391		4.96	J	831		152		--	--
	Chrysene	µg/kg	EPA 8270M	2050		778		925		5.81	J	1430		207		--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	718		203		97.8		3.52	U	225		57.4	J	--	--
	Fluoranthene	µg/kg	EPA 8270M	1220		799		488		10.0	J	3100		218		62,000	620,000
	Fluorene	µg/kg	EPA 8270M	121	J	21.0	J	23.0	J	3.52	U	75.4	J	17.9	U	--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2070		640		303		4.41	J	749		176		--	--
	Naphthalene	µg/kg	EPA 8270M	266		86.2		42.1		17.3		106		38.3	J	--	--
	Phenanthrene	µg/kg	EPA 8270M	585		380		193		9.16	J	1520		154		--	--
	Pyrene	µg/kg	EPA 8270M	1780		943		586		13.6	J	2840		256		47,000	470,000
	LPAHs	µg/kg	--	1,670		690		390		50		2,340		310		--	--
	HPAHs	µg/kg	--	18,770		6,640		4,580		60		13,460		1,860		--	--
	Total PAHs	µg/kg	--	20,440		7,330		4,970		110		15,800		2,170		--	--
	BaP Eq	µg/kg	--	3,450		1,040		560		12		1,530		330		12	--

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	10/6/2010	10/6/2010	10/7/2010	10/7/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0							
				Result	Flag	Result	Flag	Result	Flag							
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	82.9	J	60.3	J	20.6		44.4	28.7	J	5.30	J	--	--
	Acenaphthene	µg/kg	EPA 8270M	15.7	J	85.5		13.7		78.3	12.8	J	3.87	UJ	--	--
	Acenaphthylene	µg/kg	EPA 8270M	71.7	J	53.3		31.1		40.8	29.6		10.3	J	--	--
	Anthracene	µg/kg	EPA 8270M	105	J	142		53.3		273	43.7		12.1	J	--	--
	Benz(a)anthracene	µg/kg	EPA 8270M	281	J	653		155		634	182		35.3	J	--	--
	Benz(a)pyrene	µg/kg	EPA 8270M	366	J	681		199		657	300		45.3	J	--	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	409	J	723		185		637	299		37.1	J	--	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	430	J	644		210		570	361		45.6	J	--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	296	J	576		138		562	205		30.4	J	--	--
	Chrysene	µg/kg	EPA 8270M	443	J	877		212		753	261		46.8	J	--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	94.1	J	173		43.8		151	65.6		8.69	J	--	--
	Fluoranthene	µg/kg	EPA 8270M	562	J	1630		283		1450	313		65.2	J	62,000	620,000
	Fluorene	µg/kg	EPA 8270M	21.9	J	77.4		15.5		74.6	15.1		3.87	UJ	--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	322	J	524		164		473	270		33.6	J	--	--
	Naphthalene	µg/kg	EPA 8270M	142	J	104		27.8		76.5	43.4		19.2	J	--	--
	Phenanthrene	µg/kg	EPA 8270M	453	J	1160		161		961	157		39.8	J	--	--
	Pyrene	µg/kg	EPA 8270M	711	J	1310		314		1260	430		80.6	J	47,000	470,000
	LPAHs	µg/kg	--	900		1,680		330		1,550	330		90		--	--
	HPAHs	µg/kg	--	3,910		7,790		1,900		7,150	2,690		430		--	--
	Total PAHs	µg/kg	--	4,810		9,470		2,230		8,700	3,020		520		--	--
	BaP Eq	µg/kg	--	570		1,060		300		990	450		70		12	--

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration	
				10/7/2010			
				5 - 10			
					Result	Flag	
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	36.4		--	--
	Acenaphthene	µg/kg	EPA 8270M	31.8		--	--
	Acenaphthylene	µg/kg	EPA 8270M	19.4		--	--
	Anthracene	µg/kg	EPA 8270M	24.5		--	--
	Benz(a)anthracene	µg/kg	EPA 8270M	17.8		--	--
	Benz(a)pyrene	µg/kg	EPA 8270M	24.6		--	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	19.8		--	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.4		--	--
	Benzo(k)fluoranthene	µg/kg	EPA 8270M	15.8		--	--
	Chrysene	µg/kg	EPA 8270M	23.6		--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	3.78	U	--	--
	Fluoranthene	µg/kg	EPA 8270M	83.9		62,000	620,000
	Fluorene	µg/kg	EPA 8270M	22.8		--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.6	J	--	--
	Naphthalene	µg/kg	EPA 8270M	120		--	--
	Phenanthrene	µg/kg	EPA 8270M	104		--	--
	Pyrene	µg/kg	EPA 8270M	102		47,000	470,000
	LPAHs	µg/kg	--	360		--	--
	HPAHs	µg/kg	--	330		--	--
	Total PAHs	µg/kg	--	690		--	--
	BaP Eq	µg/kg	--	30		12	--

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/19/2003	12/19/2003	12/19/2003		12/19/2003	12/19/2003					
				Depth (Feet Below Ground Surface)		0.5	2.5	2.5 DUP		0.5	1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U			
	Anthracene	µg/kg	EPA 8270M	17.4		ND	U	ND	U	ND	U	ND	U			
	Benzo(a)anthracene	µg/kg	EPA 8270M	47.9		22.6		32.8		244		205				
	Benzo(a)pyrene	µg/kg	EPA 8270M	38.4		10.1		20.2		126		106				
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	62.8		10.1		24.4		169		ND	U			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	34		10	U	18.5		219		139				
	Benzo(k)fluranthene	µg/kg	EPA 8270M	13.9		10	U	10.1		ND	U	ND	U			
	Chrysene	µg/kg	EPA 8270M	41.8		10	U	11.8		ND	U	ND	U			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	11.3		ND	U	ND	U	ND	U	ND	U			
	Fluoranthene	µg/kg	EPA 8270M	69.7		10.9		30.3		253		106				
	Fluorene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	30.5		10	U	15.1		118		ND	U			
	Naphthalene	µg/kg	EPA 8270M	11.3		15.1		12.6		ND	U	ND	U			
	Phenanthrene	µg/kg	EPA 8270M	43.6		10.9		27.8		228		ND	U			
	Pyrene	µg/kg	EPA 8270M	68		16.8		51.3		337		115				
	LPAHs	µg/kg	--	70		30		40		220		0				
	HPAHs	µg/kg	--	420		110		210		1470		670				
	Total PAHs	µg/kg	--	490		140		250		1690		670				
	BaP Eq	µg/kg	--	60		10		30		180		130				

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Screening Level	Preliminary Hot Spot Concentration			
				Result	Flag	Result	Flag					
				Sample Date	12/18/2003	12/18/2003	12/18/2003	12/18/2003				
Depth (Feet Below Ground Surface)				0.5	2	0.5	2					
				Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	
	Anthracene	µg/kg	EPA 8270M	135		261		ND	U	--	--	
	Benzo(a)anthracene	µg/kg	EPA 8270M	499		1040		404		142	--	
	Benzo(a)pyrene	µg/kg	EPA 8270M	467		988		311		109	--	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	602		877		404		150	--	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	348		664		278		112	--	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	261		340		160		101	--	
	Chrysene	µg/kg	EPA 8270M	578		1640		219		86.1	--	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	
	Fluoranthene	µg/kg	EPA 8270M	720		1190		539		112	62,000	
	Fluorene	µg/kg	EPA 8270M	ND		111		ND		ND	620,000	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	301		450		219		52.4	--	
	Naphthalene	µg/kg	EPA 8270M	ND	U	253		ND		ND	--	
	Phenanthrene	µg/kg	EPA 8270M	459		1220		185		711	--	
	Pyrene	µg/kg	EPA 8270M	689		2040		463		195	47,000	
	LPAHs	µg/kg	--	590		1840		180		710	--	
	HPAHs	µg/kg	--	4470		9230		3000		1060	--	
	Total PAHs	µg/kg	--	5060		11070		3180		1770	--	
	BaP Eq	µg/kg	--	610		1240		420		150	12	

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	12/17/2003	12/17/2003	12/16/2003					
				Depth (Feet Below Ground Surface)	0.5	2.5	2					
				Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	32.1	U	--	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	36.5	U	--	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	343	U	--	--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	86.1		532		270	--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	115		903		314	--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	118		512		326	--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	117		1130		196	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	83.1		462		239	U			
	Chrysene	µg/kg	EPA 8270M	109		684		344	U			
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	19.5	U	--	--			
	Fluoranthene	µg/kg	EPA 8270M	156		2480		400				
	Fluorene	µg/kg	EPA 8270M	ND	U	23	ND	--	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	86.9		703		164	--			
	Naphthalene	µg/kg	EPA 8270M	ND	U	48.2	ND	--	--			
	Phenanthrene	µg/kg	EPA 8270M	79.3		2230		183	--			
	Pyrene	µg/kg	EPA 8270M	191		3350		607				
	LPAHs	µg/kg	--	80		2710		180	--			
	HPAHs	µg/kg	--	1060		10780		2,860	--			
	Total PAHs	µg/kg	--	1140		13490		3,040	--			
	BaP Eq	µg/kg	--	150		1110		390				
								12	--			

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	2/24/2004	2/24/2004	2/24/2004					
				Depth (Feet Below Ground Surface)	0.5	2	0.5	2.5				
				Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	10,300	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	41.3		26900	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	191		647	--			
	Anthracene	µg/kg	EPA 8270M	ND		178	143	23300	--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	81.9		579	492	20800	--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	110		712	478	12400	--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	109		572	410	10900	--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	132		816	331	1660	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	105		617	413	12900	--			
	Chrysene	µg/kg	EPA 8270M	111		719	571	24500	--			
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	150	90	844	--			
	Fluoranthene	µg/kg	EPA 8270M	150		1250	872	50500	62,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	125	ND	20300	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	91		571	268	1870	--			
	Naphthalene	µg/kg	EPA 8270M	ND	U	357	ND	10900	--			
	Phenanthrene	µg/kg	EPA 8270M	88.5		1250	577	75900	--			
	Pyrene	µg/kg	EPA 8270M	166		1690	1190	53500	47,000			
	LPAHs	µg/kg	--	80		2140	720	168250	--			
	HPAHs	µg/kg	--	1060		7680	5120	189870	--			
	Total PAHs	µg/kg	--	1140		9820	5840	358120	--			
	BaP Eq	µg/kg	--	140		1050	690	16770	12			

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003	12/22/2003	12/22/2003					
				Depth (Feet Below Ground Surface)		0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	22.7		ND	U	--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	50.4		70.6		27.1		--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	30.7		46.3		23.8		--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	48.8		57.6		19.7		--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.6		27.6		16.4		--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		33.3		21.3		--			
	Chrysene	µg/kg	EPA 8270M	19.7		27.6		19.7		--			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--			
	Fluoranthene	µg/kg	EPA 8270M	30		77.9		13.9		62,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	10.6		ND	U	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.9		23.5		ND	U	--			
	Naphthalene	µg/kg	EPA 8270M	19.7	U	ND		ND	U	--			
	Phenanthrene	µg/kg	EPA 8270M	27.5		68.2		ND	U	--			
	Pyrene	µg/kg	EPA 8270M	76.3		124		41.8		47,000			
	LPAHs	µg/kg	--	50		100		0		--			
	HPAHs	µg/kg	--	290		490		180		--			
	Total PAHs	µg/kg	--	340		590		180		--			
	BaP Eq	µg/kg	--	40		60		30		12			

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313				Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003	12/22/2003	12/22/2003					
				Depth (Feet Below Ground Surface)		0.5	2	5					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--			
	Acenaphthene	µg/kg	EPA 8270M	50.6		ND	U	ND	U	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--			
	Anthracene	µg/kg	EPA 8270M	64.7		ND	U	132		--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	1340		73.2		2890		--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2380		97.7		4030		--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2280		119		4070		--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1180		101		3120		--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3230		61.8		3590		--			
	Chrysene	µg/kg	EPA 8270M	2730		95.2		3990		--			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	486		27.7		1320		--			
	Fluoranthene	µg/kg	EPA 8270M	1240		61.8		2910		62,000			
	Fluorene	µg/kg	EPA 8270M	35.7		ND		ND	U	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1280		85.4		2920		--			
	Naphthalene	µg/kg	EPA 8270M	93.7		22		ND	U	--			
	Phenanthrene	µg/kg	EPA 8270M	477		35		762		--			
	Pyrene	µg/kg	EPA 8270M	1310		84.6		3170		47,000			
	LPAHs	µg/kg	--	720		50		890		--			
	HPAHs	µg/kg	--	17460		810		32010		--			
	Total PAHs	µg/kg	--	18180		860		32900		--			
	BaP Eq	µg/kg	--	3400		150		6410		10			

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		2/24/2004	2/24/2004						
				Depth (Feet Below Ground Surface)		0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	52.3		40.3	--	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	1270		ND	--	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	744		45.6	--	--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	242		3010		334	--	--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	ND		3270		446	--	--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	10.8		2830		605	--	--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	ND		2840		212	--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		3660		313	--	--			
	Chrysene	µg/kg	EPA 8270M	ND		3470		539	--	--			
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	381		71.5	--	--			
	Fluoranthene	µg/kg	EPA 8270M	10.8		6790		321	62,000	620,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	208		27.4	--	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	ND		2020		218	--	--			
	Naphthalene	µg/kg	EPA 8270M	ND	U	204		49.5	--	--			
	Phenanthrene	µg/kg	EPA 8270M	ND		4380		189	--	--			
	Pyrene	µg/kg	EPA 8270M	20.9		10800		495	47,000	470,000			
	LPAHs	µg/kg	--	0		6860		360	--	--			
	HPAHs	µg/kg	--	280		39070		3550	--	--			
	Total PAHs	µg/kg	--	280		45930		3910	--	--			
	BaP Eq	µg/kg	--	30		4510		640	10	--			

Please refer to notes at end of table.

Table C-7

Sediment Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003	12/22/2003	12/22/2003							
				Depth (Feet Below Ground Surface)		0.5	2.5	5							
				Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	322		ND	U	--	--	--			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	102		ND	U	--	--	--			
	Anthracene	µg/kg	EPA 8270M	44.1		429		11.6		--	--	--			
	Benzo(a)anthracene	µg/kg	EPA 8270M	84.2		543		26.2		--	--	--			
	Benzo(a)pyrene	µg/kg	EPA 8270M	40.9		338		11.6		--	--	--			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	75.4		338		11.6		--	--	--			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	46.5		169		ND	U	--	--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	78.6		177		ND	U	--	--	--			
	Chrysene	µg/kg	EPA 8270M	120		1400		ND	U	--	--	--			
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	--			
	Fluoranthene	µg/kg	EPA 8270M	64.2		544		41.7		62,000		620,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	940		10		--	--	--			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	26.5		66.8		ND	U	--	--	--			
	Naphthalene	µg/kg	EPA 8270M	ND	U	ND	U	56.3		--	--	--			
	Phenanthrene	µg/kg	EPA 8270M	43.3		1190		50.9		--	--	--			
	Pyrene	µg/kg	EPA 8270M	93.1		2170		61		47,000		470,000			
	LPAHs	µg/kg	--	90		2980		130		--	--	--			
	HPAHs	µg/kg	--	630		5750		150		--	--	--			
	Total PAHs	µg/kg	--	720		8730		280		--	--	--			
	BaP Eq	µg/kg	--	60		440		20		10		--			

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-8

Sediment Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	112		80.3		76.0		39.3	J	22.0	J	91.8		--	--		
	Acenaphthene	µg/kg	EPA 8270M	130		101		7.50	J	13.4	J	9.8	J	51.4		--	--		
	Acenaphthylene	µg/kg	EPA 8270M	63.1	J	86.6		23.9	J	43.9		14.8	J	37.2		--	--		
	Anthracene	µg/kg	EPA 8270M	214		286		43.4		30.1		23.4	J	115		--	--		
	Benzo(a)anthracene	µg/kg	EPA 8270M	428		1370		106		127		139		318		--	--		
	Benzo(a)pyrene	µg/kg	EPA 8270M	501		967		149		206	J	244		426		--	--		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	477		1570		134		257		240		469		--	--		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	483		861		357		327		289		581		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	372		969		105		180		177		372		--	--		
	Chrysene	µg/kg	EPA 8270M	550		2180		179		318		217		428		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	109		280		47.5		56.0		72.2		131		--	--		
	Fluoranthene	µg/kg	EPA 8270M	877		1870		216		637		234		637		62,000	620,000		
	Fluorene	µg/kg	EPA 8270M	113		103		11.2	J	32.8		12.7	J	43.5		--	--		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	361		700		152		216		228		409		--	--		
	Naphthalene	µg/kg	EPA 8270M	125		150		55.9		124		26.2	J	117		--	--		
	Phenanthrene	µg/kg	EPA 8270M	1070		1110		212		697		191		394		--	--		
	Pyrene	µg/kg	EPA 8270M	924		1670		259		758		288		618		47,000	470,000		
	LPAHs	µg/kg	--	1,830		1,910		430		980		300		850		--	--		
	HPAHs	µg/kg	--	5,080		12,440		1,700		3,080		2,130		4,390		--	--		
	Total PAHs	µg/kg	--	6,910		14,350		2,130		4,060		2,430		5,240		--	--		
	BaP Eq	µg/kg	--	750		1,630		240		330		380		690		10	--		

Please refer to notes at end of table.

Table C-8

Sediment Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	192		44.3		94.1		56.6		31.6	J	12.1	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	291		23.4	J	116		20.4	J	17.2	J	5.36	J	--	--		
	Acenaphthylene	µg/kg	EPA 8270M	166		26.6	J	104		183		34.7		8.73	J	--	--		
	Anthracene	µg/kg	EPA 8270M	2000		65.3		604		165		60.1		9.12	J	--	--		
	Benzo(a)anthracene	µg/kg	EPA 8270M	5870		231		1800		559		210		16.3		--	--		
	Benzo(a)pyrene	µg/kg	EPA 8270M	3970		284		1680		705		278		18.7		--	--		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	4060		316		1710		597		260		42.5		--	--		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2730		295		1210		748		315		21.3		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3450		219		1370		467		236		18.8		--	--		
	Chrysene	µg/kg	EPA 8270M	6390		316		1990		685		283		36.6		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	874		71.3		300		135		66.8		4.39	J	--	--		
	Fluoranthene	µg/kg	EPA 8270M	10300		393		3910		1150		368		41.0		62,000	620,000		
	Fluorene	µg/kg	EPA 8270M	366		21.4	J	123		34.0		15.8	J	8.12	J	--	--		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2430		221		1010		540		238		15.7		--	--		
	Naphthalene	µg/kg	EPA 8270M	401		56.5		169		111		54.1		33.8		--	--		
	Phenanthrene	µg/kg	EPA 8270M	7490		198		2080		720		188		35.5		--	--		
	Pyrene	µg/kg	EPA 8270M	11200		402		3790		1340		390		41.0		47,000	470,000		
	LPAHs	µg/kg	--	10,910		430		3,290		1,290		410		110		--	--		
	HPAHs	µg/kg	--	51,270		2,750		18,770		6,930		2,640		260		--	--		
	Total PAHs	µg/kg	--	62,180		3,180		22,060		8,220		3,050		370		--	--		
	BaP Eq	µg/kg	--	6,150		440		2,460		1,020		420		30		10	--		

Please refer to notes at end of table.

Table C-8

Sediment Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	9.36	J	4.94	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	3.92	U	4.23	U	--	--		
	Acenaphthylene	µg/kg	EPA 8270M	9.18	J	10.3	J	--	--		
	Anthracene	µg/kg	EPA 8270M	9.18	J	6.47	J	--	--		
	Benzo(a)anthracene	µg/kg	EPA 8270M	25.6		20.1		--	--		
	Benzo(a)pyrene	µg/kg	EPA 8270M	32.1		28.5		--	--		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	40.2		24.5		--	--		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	29.1		27.9		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	31.2		20.8		--	--		
	Chrysene	µg/kg	EPA 8270M	44.7		27.6		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	6.82	J	5.53	J	--	--		
	Fluoranthene	µg/kg	EPA 8270M	66.2		34.0		62,000	620,000		
	Fluorene	µg/kg	EPA 8270M	5.82	J	4.23	U	--	--		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	23.6		21.4		--	--		
	Naphthalene	µg/kg	EPA 8270M	27.2		16.1	J	--	--		
	Phenanthrene	µg/kg	EPA 8270M	55.1		24.5		--	--		
	Pyrene	µg/kg	EPA 8270M	57.6		48.1		47,000	470,000		
	LPAHs	µg/kg	--	120		70		--	--		
	HPAHs	µg/kg	--	360		260		--	--		
	Total PAHs	µg/kg	--	480		330		--	--		
	BaP Eq	µg/kg	--	50		40		10	--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-9

Sediment Human Health - Composite Sample PAHs Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	63.9			77.1	
	Acenaphthene	µg/kg	EPA 8270M	26.2	J	22.0	56.6	--
	Acenaphthylene	µg/kg	EPA 8270M	31.1	J	31.3	44.1	--
	Anthracene	µg/kg	EPA 8270M	78.9		74.4	128	--
	Benzo(a)anthracene	µg/kg	EPA 8270M	202		225	394	--
	Benzo(a)pyrene	µg/kg	EPA 8270M	280		280	447	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	308		289	417	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	342		361	474	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	267		217	344	--
	Chrysene	µg/kg	EPA 8270M	277		317	526	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	75.3		76.5	112	--
	Fluoranthene	µg/kg	EPA 8270M	463		404	724	62,000
	Fluorene	µg/kg	EPA 8270M	27.2	J	23.0	J	620,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	246		257	370	--
	Naphthalene	µg/kg	EPA 8270M	86.6		69.9	118	--
	Phenanthrene	µg/kg	EPA 8270M	265		270	511	--
	Pyrene	µg/kg	EPA 8270M	394		433	738	47,000
	LPAHs	µg/kg	--	580		530	980	--
	HPAHs	µg/kg	--	2,850		2,860	4,550	--
	Total PAHs	µg/kg	--	3,430		3,390	5,530	--
	BaP Eq	µg/kg	--	440		440	690	10

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7- Surface - 11FS	100710-3-3.7- 5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9- Surface-10-FS	100710-3-3.9- 5-01-FS	Primary Screening Level						
				Sample Date		10/7/2010		10/6/2010		10/6/2010		10/7/2010		10/7/2010		
				Depth (Feet Below Ground Surface)		0		0 - 5		0		0 - 5		0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	301	U	152	U	320	U	312	U	148	U	314	U	--
Please refer to notes at end of table.																

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Primary Screening Level	
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003			
Depth (Feet Below Ground Surface)				0.5	2.5	2.5 DUP		0.5		1.5							
SVOCs		Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	ND	U	ND	--	

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level
				Sample Date		12/18/2003		12/18/2003		12/18/2003		
Depth (Feet Below Ground Surface)				0.5	2	0.5				2		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	Result	Flag	Result	Flag	Result	Flag	Result	Flag	--
				ND	U	ND	U	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level		
				Sample Date	12/17/2003	Depth (Feet Below Ground Surface)	0.5			
							2.5	2		
				Result	Flag	Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level
				Sample Date		Depth (Feet Below Ground Surface)		Result		Flag		
SVOCS	Dibenzofuran	µg/kg	EPA 8082	2/24/2004	0.5	2/24/2004	2	2/24/2004	0.5	2/24/2004	2.5	
				ND	U	ND	U	ND	U	13,200	--	--

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Primary Screening Level
				Sample Date	12/22/2003	12/22/2003	12/22/2003	
				Depth (Feet Below Ground Surface)	0.5	2.5	5	
				Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--
							--	--

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	--		

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Primary Screening Level
				Sample Date	2/24/2004	2/24/2004	2/24/2004	
				Depth (Feet Below Ground Surface)	0.5	2.5	5	
				Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-10

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Primary Screening Level
				Sample Date	12/22/2003	12/22/2003	12/22/2003	
				Depth (Feet Below Ground Surface)	0.5	2.5	5	
				Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010							
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15							
				Result	Flag	Result	Flag	Result	Flag							
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	766		80.2	U	2070	U	17.0	U	18.1	U	1170	--	--

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	0								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	807	U	29.8	U	683		14.3	U	10000		187	J	--	--

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	10/6/2010	10/6/2010	10/7/2010					
				Depth (Feet Below Ground Surface)	0	0 - 5	0					
				Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	27100		773		252		4610	--	--

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/7/2010	10/7/2010		
				Depth (Feet Below Ground Surface)	0	0 - 5		
					Result	Flag	Result	Flag
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	578	72.2	J	15.3	U
					--		--	

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/19/2003	12/19/2003	12/19/2003	Sample Date		12/19/2003	12/19/2003					
				Depth (Feet Below Ground Surface)		0.5	2.5	2.5 DUP			0.5	1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	682		ND	U	--	--		

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	12/18/2003	12/18/2003	12/18/2003					
Depth (Feet Below Ground Surface)				0.5	2	0.5	2					
				Result	Flag	Result	Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--	

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	12/17/2003	12/17/2003	12/16/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	2						
				Result	Flag	Result	Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U			
						--		--				

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Primary Screening Level	Preliminary Hot Spot Concentration			
				100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS					
Sample Date				2/24/2004	2/24/2004	2/24/2004	2/24/2004	Primary Screening Level	Preliminary Hot Spot Concentration			
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5					
				Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND		ND						
						ND						
						ND						

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method					Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	12/22/2003	12/22/2003	12/22/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	5						
				Result	Flag	Result	Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	586	--			

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313			Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date	12/22/2003	12/22/2003		
Depth (Feet Below Ground Surface)				0.5	2.5	5		
				Result	Flag	Result	Flag	Result
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	765		ND	U	--
						--		--

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		2/24/2004	2/24/2004					
Depth (Feet Below Ground Surface)				0.5	2.5	5						
				Result	Flag	Result	Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	1050		--	--			

Please refer to notes at end of table.

Table C-11

Sediment Human Health - Boring Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Primary Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003	12/22/2003	12/22/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	5							
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	--		--			
								--		--			

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-12

Sediment Human Health - Surface Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	165		527		69.9	U	129	J	75.5	U	10800		--	--		

Please refer to notes at end of table.

Table C-12

Sediment Human Health - Surface Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	5370		974		710	J	5320		2110		15.0	U	--	--		

Please refer to notes at end of table.

Table C-12

Sediment Human Health - Surface Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/15/2010	10/15/2010					
					Result	Flag	Result				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	26.7	J	17.1	U	--	--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-13

Sediment Human Health - Composite Sample Phthalates Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	31200		1370	--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration				
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010						
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15						
				Result	Flag	Result	Flag	Result	Flag						
Organotins	Dibutyltin	µg/kg	PSEP M	--		--		--		--	--				
	Monobutyltin	µg/kg	PSEP M	--		--		--		--	--				
	Tetra-n-butyltin	µg/kg	PSEP M	--		--		--		--	--				
	Tributyltin	µg/kg	PSEP	0.94	U	1.0	U	1.1	UJ	1.1	U	1.2	U	23	10

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-	100510-3-3.5-05-01-	100610-3-3.6-15-03	100710-3-3.7-	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-	Screening Level	Preliminary Hot Spot Concentration			
				FS	FS	FS	Surface -11FS	TOB						
				Sample Date	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010				
				Depth (Feet Below Ground Surface)	5 - 10	0 - 5	10 - 15	0	0 - 5	0				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Dibutyltin	µg/kg	PSEP M	--		--		--		--		--		
	Monobutyltin	µg/kg	PSEP M	--		--		--		--		--		
	Tetra-n-butyltin	µg/kg	PSEP M	--		--		--		--		--		
	Tributyltin	µg/kg	PSEP	1.1	U	2.9		0.9	U	0.91	U	0.90		

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date		10/6/2010		10/7/2010		10/7/2010		10/7/2010				
				Depth (Feet Below Ground Surface)		0 - 5		0		0 - 5		5 - 10				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Dibutyltin	µg/kg	PSEP M	--		--		--		--		--	--			
	Monobutyltin	µg/kg	PSEP M	--		--		--		--		--	--			
	Tetra-n-butyltin	µg/kg	PSEP M	--		--		--		--		--	--			
	Tributyltin	µg/kg	PSEP	0.98	U	30		0.99	U	0.91	U	0.97	UJ	0.95	U	10

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/19/2003		12/19/2003		12/19/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5		2.5 DUP					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	3.88		ND	U	ND	U	ND	U	ND	U	--	--
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	--	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	--	--
	Tributyltin	µg/kg	PSEP	8.44		ND	U	ND	U	ND	U	ND	U	10	100

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Primary Screening Level	Preliminary Hot Spot Concentration				
				Sample Date	12/18/2003	12/18/2003	12/18/2003						
				Depth (Feet Below Ground Surface)	0.5	2	0.5	2					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.44		ND	U	--	--
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.62		ND	U	--	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	--	--
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	10.5		ND	U	10	100

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34		Primary Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		Depth (Feet Below Ground Surface)		Result	Flag	Result	Flag
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.75	--	--	--
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.5	--	--	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	--	--
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	6.05	10	100	

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	16.6		10.5		ND	U	15.2		--	--		
	Monobutyltin	µg/kg	PSEP	13.4		13.4		ND	U	9.83		--	--		
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	--	--		
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	15.7		10	100		

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	15.1	--	--	--	--	--
	Monobutyltin	µg/kg	PSEP	45.1		13.4	--	--	--	--	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--
	Tributyltin	µg/kg	PSEP	ND		ND	--	--	10	100	

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	11.8	--	--	--	--	--	10	100	
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--			
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--			
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	--	--	10	100			

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result		Flag		Result		Flag			
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	14.3		--		--	--		
	Monobutyltin	µg/kg	PSEP	ND	U	14.2		--		--	--		
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	--	--		
	Tributyltin	µg/kg	PSEP	ND	U	15.9		--		10	100		

Please refer to notes at end of table.

Table C-14

Sediment Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	21		26.1	--	--	--				
	Monobutyltin	µg/kg	PSEP	23.4		10.4	--	--	--				
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--	--				
	Tributyltin	µg/kg	PSEP	26.1		ND	U	--	10		100		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-15

Sediment Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	1.0	U	1.1	U	1.1	U	1.1	U	1.2	U	10	100		

Please refer to notes at end of table.

Table C-15

Sediment Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	0.89	U	1.0	U	0.94	U	1.0	U	0.97	U	10	100		

Please refer to notes at end of table.

Table C-15

Sediment Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.1	U	0.98	U	10	100		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-16

Sediment Human Health - Composite Sample Organotins Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	10/15/2010	10/15/2010		
Organotins	Tributyltin	µg/kg	PSEP	34		1.0	U	0.98
						U	10	100

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-17

Sediment Human Health - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-	101510-3-3.7-	100610-3-3.8-	101510-3-3.8-	100710-3-3.9-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration		
				Composite-12-WS	Composite-07-FS	Composite WS	Composite-11-FS	Composite-11-WS	Composite-14-FS				
				Sample Date	10/7/2010	10/15/2010	10/6/2010	10/15/2010	10/7/2010				
Dioxins/Furans	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Screening Level	Preliminary Hot Spot Concentration	
	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	120		4,600	J	79		1,200		85	8,500
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	42		890		26		290		85	8,500
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	5.7		140		2.7		34		85	8,500
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	1.8	J	49		0.9	J	9.8		0.34	34
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	17		280		6.9		57		0.34	34
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	5.9		170		4.2	J	51		0.34	34
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	8.2		180		3.5	J	39		0.34	34
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	4.7	J	95		1.7	J	20		0.34	34
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	0.7	J	21		0.52	U	2.6		0.34	34
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	1.1	J	24		0.73	J	7.7		0.03	3
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	6.1		170		2.7	J	29		0.31	31
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	6.5		180		3.0	J	34		0.34	34
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	12		440		5.5		68		0.0037	0.37
	2,3,7,8-TCDD	ng/kg	EPA 8290	0.51	J	6		0.35	J	2.9		0.0011	0.11
	2,3,7,8-TCDF	ng/kg	EPA 8290	11		330		5.1		89		0.094	9.4
	OCDD	ng/kg	EPA 8290	1,200		28,000	J	970		10,000	J	1,200	280,000
	OCDF	ng/kg	EPA 8290	--		--		--		--		--	--
	Total HpCDD	ng/kg	EPA 8290	--		--		--		--		--	--
	Total HpCDF	ng/kg	EPA 8290	--		--		--		--		--	--
	Total HxCDD	ng/kg	EPA 8290	--		--		--		--		--	--
	Total HxCDF	ng/kg	EPA 8290	--		--		--		--		--	--
	Total PeCDD	ng/kg	EPA 8290	--		--		--		--		--	--
	Total PeCDF	ng/kg	EPA 8290	--		--		--		--		--	--
	Total TCDD	ng/kg	EPA 8290	12		83		3.4		23		47	0.0011
	Total TCDF	ng/kg	EPA 8290	--		--		--		--		--	--

Please refer to notes at end of table.

Table C-17

Sediment Human Health - Composite Sample Dioxins/Furans Results
 Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	2468-001-SA P4B0481	2468-001-SA P4B0481	2468-001-SA P4B0481	Screening Level	Preliminary Hot Spot Concentration
				HA43A-2.0	HA42A-2.0	GP314AA-1.5		
				Sample Date	Result	Flag	Result	Flag
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	5970			2,310	
	1,2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	1890			673	
	1,2,3,4,7,8,9-HxCDF	ng/kg	EPA 8290	216.0			109	
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	80.9			90	
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	729			512	
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	315.0			222	
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	391.0			180	
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	160.0			109	
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	149.0			78	
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	65.5			68	
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	349.0			148	
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	564.0			110	
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	807			139	
	2,3,7,8-TCDD	ng/kg	EPA 8290	17.10			5.2	
	2,3,7,8-TCDF	ng/kg	EPA 8290	730			108	
	OCDD	ng/kg	EPA 8290	56,500			12,400	
	OCDF	ng/kg	EPA 8290	2,690			562	
	Total HpCDD	ng/kg	EPA 8290	--			--	
	Total HpCDF	ng/kg	EPA 8290	--			--	
	Total HxCDD	ng/kg	EPA 8290	--			--	
	Total HxCDF	ng/kg	EPA 8290	--			--	
	Total PeCDD	ng/kg	EPA 8290	--			--	
	Total PeCDF	ng/kg	EPA 8290	--			--	
	Total TCDD	ng/kg	EPA 8290	--			--	0.0011
	Total TCDF	ng/kg	EPA 8290	--			--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010		
				Depth (Feet Below Ground Surface)		0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.413		0.317		0.0133	J	0.0616	J	0.0449	
	Arsenic	mg/kg	EPA 6020	143	J	14.1		12.7		11.8		12.7	27.4
	Barium	mg/kg	EPA 6020	246		273		391		218		216	281
	Chromium	mg/kg	EPA 6020	407		82.3		31.6		29.6		26.6	183
	Copper	mg/kg	EPA 6020	568		123		37.3		34.2		32.1	587
	Lead	mg/kg	EPA 6020	898		224		895		27.8		27.4	738
	Manganese	mg/kg	EPA 6020	915		670		543		819		969	1,650
	Nickel	mg/kg	EPA 6020	228		51.0		24.4		26.0		26.0	176
	Selenium	mg/kg	EPA 6020	0.398	J	0.266		0.488	J	0.0627	J	0.0131	U
	Silver	mg/kg	EPA 6020	2.83		0.357	J	4.09		0.220	J	0.262	J
	Zinc	mg/kg	EPA 6020	2,700		320		488		115		98.9	1,520
	Antimony	mg/kg	EPA 602	--		--		--		--		--	--
	Cadmium	mg/kg	EPA 602	--		--		--		--		--	1

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100610-3-3.6-25-06 DUP	100710-3-3.7-Surface -11FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date		9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/6/2010	10/7/2010						
				Depth (Feet Below Ground Surface)		5 - 10	10 - 15	0 - 5	10 - 15	20 - 25	0						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	0.175	J	0.176		0.102		0.0262	J	0.0770	J	5.71	0.07	Bkgd	
	Arsenic	mg/kg	EPA 6020	9.40		4.37		8.42		2.37	J	2.41	J	29.1	7	170	
	Barium	mg/kg	EPA 6020	202	J	149		218		68.6		113		458	--	--	
	Chromium	mg/kg	EPA 6020	220	J	446		38.2		16.5		18.9		279	90	900	
	Copper	mg/kg	EPA 6020	109	J	53.1		100		16.3		18.4		1,840	149	1,490	
	Lead	mg/kg	EPA 6020	772		267		416		3.92		4.87	J	1,780	17	913	
	Manganese	mg/kg	EPA 6020	2,110		2,850		527		267		248		1,940	1,100	11,000	
	Nickel	mg/kg	EPA 6020	92		263		38.1		19.5		22.1		447	36	486	
	Selenium	mg/kg	EPA 6020	5.76		2.29		0.239	J	0.0109	U	0.0117	U	0.697	J	2	Bkgd
	Silver	mg/kg	EPA 6020	0.766		0.630		0.311	J	0.0544	J	0.0587	J	5.45	5	50	
	Zinc	mg/kg	EPA 6020	473		212		513		52.6		58.6		5,510	315	3,150	
	Antimony	mg/kg	EPA 602	--		--		--		--		--		--	64	640	
	Cadmium	mg/kg	EPA 602	--		--		--		--		--		--	1	35	

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010				
Depth (Feet Below Ground Surface)				0 - 5	0	0 - 5	0	0 - 5	0				
		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	1.92	J	1.82		0.963		1.27		3.24	
	Arsenic	mg/kg	EPA 6020	7.95		21.3		18.5		19.3		18.5	
	Barium	mg/kg	EPA 6020	118		343		292		188		328	
	Chromium	mg/kg	EPA 6020	69.1		132		193		185		281	
	Copper	mg/kg	EPA 6020	500		13,300		536		724		1,740	
	Lead	mg/kg	EPA 6020	331		1,860		2,430		617		988	
	Manganese	mg/kg	EPA 6020	518		1,150		1,450		1,640		2,970	
	Nickel	mg/kg	EPA 6020	98.2		235		287		192		248	
	Selenium	mg/kg	EPA 6020	0.133	J	1.78	J	0.611	J	0.126		1.23	
	Silver	mg/kg	EPA 6020	0.374	J	3.22	J	0.750	J	0.680		4.89	
	Zinc	mg/kg	EPA 6020	463		4,800		1,890		1,440		1,810	
	Antimony	mg/kg	EPA 602	--		--		--		--		--	
	Cadmium	mg/kg	EPA 602	--		--		--		--		--	

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-5-	100710-3-3.10-	Screening Level	Preliminary Hot Spot Concentration				
				01-FS	10-02-FS						
Sample Date				10/7/2010	10/7/2010						
Depth (Feet Below Ground Surface)				0 - 5	5 - 10						
				Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.115	J	0.393					
	Arsenic	mg/kg	EPA 6020	3.34		2.87	7				
	Barium	mg/kg	EPA 6020	95.5		97.0	--				
	Chromium	mg/kg	EPA 6020	19.3		18.8	90				
	Copper	mg/kg	EPA 6020	31.9		20.3	149				
	Lead	mg/kg	EPA 6020	26.8		8.93	17				
	Manganese	mg/kg	EPA 6020	340		289	1,100				
	Nickel	mg/kg	EPA 6020	17.4		19.6	36				
	Selenium	mg/kg	EPA 6020	0.296	J	0.0113	U				
	Silver	mg/kg	EPA 6020	0.196	J	0.141	J				
	Zinc	mg/kg	EPA 6020	80.7		59.8	315				
	Antimony	mg/kg	EPA 602	--		--	64				
	Cadmium	mg/kg	EPA 602	--		--	1				
							35				

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/19/2003		12/19/2003		12/19/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5		1.5	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.189		0.089		ND	U	0.3080		0.2650	
	Arsenic	mg/kg	EPA 6020	28.8		7.37		3.7		43.2		43.3	7
	Barium	mg/kg	EPA 6020	364		115		57		260		201	--
	Chromium	mg/kg	EPA 6020	47.6		ND		31.7		119.0		80.5	90
	Copper	mg/kg	EPA 6020	264		102		37.3		768.0		637.0	149
	Lead	mg/kg	EPA 6020	561		114		100		673.0		398.0	17
	Manganese	mg/kg	EPA 6020	1430		833		698		1440		1330	1,100
	Nickel	mg/kg	EPA 6020	74.1		111		150.0		244.0		126.0	36
	Selenium	mg/kg	EPA 6020	0.505		ND	U	ND	U	0.6360		0.5060	2
	Silver	mg/kg	EPA 6020	ND		ND	U	ND	U	0.518		0.529	5
	Zinc	mg/kg	EPA 6020	1010		234		175		1380		1190.0	315
	Antimony	mg/kg	EPA 602	9.87		1.46		0.931		21.9		10.1	64
	Cadmium	mg/kg	EPA 602	0.458		ND	U	ND	U	1.17		0.895	1

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
Depth (Feet Below Ground Surface)				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.694		1		0.2600		0.1220		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	6.35		8.22		8.4		3.6		7	170
	Barium	mg/kg	EPA 6020	160		196		157		97		--	--
	Chromium	mg/kg	EPA 6020	89.8		67.4		49.2		21.2		90	900
	Copper	mg/kg	EPA 6020	174		275		87.0		42.3		149	1,490
	Lead	mg/kg	EPA 6020	406		437		816		109.0		17	913
	Manganese	mg/kg	EPA 6020	1000		873		1020		297		1,100	11,000
	Nickel	mg/kg	EPA 6020	93.2		99.1		44.0		28.9		36	486
	Selenium	mg/kg	EPA 6020	ND	U	0.502		0.448		ND	U	2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	0.522		ND		ND	U	5	50
	Zinc	mg/kg	EPA 6020	1560		1000		530		152		315	3,150
	Antimony	mg/kg	EPA 602	4.92		7.82		3.53		0.494		64	640
	Cadmium	mg/kg	EPA 602	ND	U	1.29		ND	U	ND	U	1	35

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Screening Level	Preliminary Hot Spot Concentration	
				Sample Date	12/17/2003	Result	Flag			
Depth (Feet Below Ground Surface)		0.5		2.5		2		U	Bkgd	
		Result	Flag	Result	Flag	Result	Flag			
Inorganics	Mercury	mg/kg	EPA 7471A	0.307		0.427		U	Bkgd	
	Arsenic	mg/kg	EPA 6020	4.68		2.35				
	Barium	mg/kg	EPA 6020	188		181				
	Chromium	mg/kg	EPA 6020	35.3		21.1				
	Copper	mg/kg	EPA 6020	126		25.9				
	Lead	mg/kg	EPA 6020	242		13.7				
	Manganese	mg/kg	EPA 6020	310		303				
	Nickel	mg/kg	EPA 6020	43.6		24.1				
	Selenium	mg/kg	EPA 6020	0.893		ND	U			
	Silver	mg/kg	EPA 6020	ND		ND	U			
	Zinc	mg/kg	EPA 6020	564		83.6				
	Antimony	mg/kg	EPA 602	2.24		ND	U			
	Cadmium	mg/kg	EPA 602	0.857		ND	U			

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		2/24/2004		2/24/2004		2/24/2004							
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5										
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	0.483		4.57		0.99		10.6		0.07	Bkgd				
	Arsenic	mg/kg	EPA 6020	19.4		40.7		24.4		27		7	170				
	Barium	mg/kg	EPA 6020	165		637		243		613		--	--				
	Chromium	mg/kg	EPA 6020	142		464		194		259		90	900				
	Copper	mg/kg	EPA 6020	333		1990		1370		1760		149	1,490				
	Lead	mg/kg	EPA 6020	591		2650		1030		2950		17	913				
	Manganese	mg/kg	EPA 6020	629		1860		2220		2330		1,100	11,000				
	Nickel	mg/kg	EPA 6020	174		627		341		309		36	486				
	Selenium	mg/kg	EPA 6020	0.878		0.831		ND		1.05		2	Bkgd				
	Silver	mg/kg	EPA 6020	ND		2.09		0.781		1.93		5	50				
	Zinc	mg/kg	EPA 6020	1290		9000		4220		5020		315	3,150				
	Antimony	mg/kg	EPA 602	7.44		47		18		55.1		64	640				
	Cadmium	mg/kg	EPA 602	6.29		26.7		9.3		18.7		1	35				

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003			
Depth (Feet Below Ground Surface)				0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.466		0.161		ND	
	Arsenic	mg/kg	EPA 6020	3.51		1.72		5.74	7
	Barium	mg/kg	EPA 6020	140		104		135	--
	Chromium	mg/kg	EPA 6020	30.9		16.4		18.7	90
	Copper	mg/kg	EPA 6020	54.8		60		33.7	149
	Lead	mg/kg	EPA 6020	114		78.3		55.1	17
	Manganese	mg/kg	EPA 6020	427		390		567	1,100
	Nickel	mg/kg	EPA 6020	31.3		14.1		21.2	36
	Selenium	mg/kg	EPA 6020	0.529		ND	U	0.485	2
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	Bkgd
	Zinc	mg/kg	EPA 6020	179		127		102	5
	Antimony	mg/kg	EPA 602	0.872		2.26		1.83	64
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	35

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
Depth (Feet Below Ground Surface)				0.5	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.24		ND		0.0686		0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	5.29		2.44		2.48		7	170		
	Barium	mg/kg	EPA 6020	165		107		53.3		--	--		
	Chromium	mg/kg	EPA 6020	154		14.6		141		90	900		
	Copper	mg/kg	EPA 6020	66.2		46.6		74.2		149	1,490		
	Lead	mg/kg	EPA 6020	206		127		21.1		17	913		
	Manganese	mg/kg	EPA 6020	1520		398		1440		1,100	11,000		
	Nickel	mg/kg	EPA 6020	252		32.4		159		36	486		
	Selenium	mg/kg	EPA 6020	1.15		ND	U	0.658		2	Bkgd		
	Silver	mg/kg	EPA 6020	ND		ND	U	ND		5	50		
	Zinc	mg/kg	EPA 6020	190		90		65.1		315	3,150		
	Antimony	mg/kg	EPA 602	2.15		ND	U	ND	U	64	640		
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	1	35		

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	ND	U	2.08		0.208		0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	15.3		20.2		4.17		7	170
	Barium	mg/kg	EPA 6020	192		210		67.3		--	--
	Chromium	mg/kg	EPA 6020	24.5		158		153		90	900
	Copper	mg/kg	EPA 6020	32.7		612		89		149	1,490
	Lead	mg/kg	EPA 6020	105		689		76.8		17	913
	Manganese	mg/kg	EPA 6020	1.070		1,710		2,720		1,100	11,000
	Nickel	mg/kg	EPA 6020	20.1		188		385		36	486
	Selenium	mg/kg	EPA 6020	ND	U	1.79		1.3		2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	2.22		ND		5	50
	Zinc	mg/kg	EPA 6020	138		2,100		130		315	3,150
	Antimony	mg/kg	EPA 602	ND	U	14.5		ND	U	5	640
	Cadmium	mg/kg	EPA 602	ND	U	4.69		ND	U	1	35

Please refer to notes at end of table.

Table C-18

Ecological Health Sediment - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5	5	Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.19			ND	U	ND	U	0.07	Bkgd
	Arsenic	mg/kg	EPA 6020	1.04			1.16		1.87		7	170
	Barium	mg/kg	EPA 6020	122			86.7		93.4		--	--
	Chromium	mg/kg	EPA 6020	9.79			11.6		13.1		90	900
	Copper	mg/kg	EPA 6020	30.5			18.9		16.9		149	1,490
	Lead	mg/kg	EPA 6020	22.1			7.17		5.4		17	913
	Manganese	mg/kg	EPA 6020	853			292		233		1,100	11,000
	Nickel	mg/kg	EPA 6020	8.89			15.7		17.9		36	486
	Selenium	mg/kg	EPA 6020	ND	U	ND	U		ND	U	2	Bkgd
	Silver	mg/kg	EPA 6020	ND	U	ND	U		ND	U	5	50
	Zinc	mg/kg	EPA 6020	81.8			54		52.7		315	3,150
	Antimony	mg/kg	EPA 602	ND	U	ND	U		ND	U	64	640
	Cadmium	mg/kg	EPA 602	ND	U	ND	U		ND	U	1	35

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available
2. mg/kg = milligrams per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-19

Ecological Health Sediment - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	2.64		1.93		2.41		2.13		0.226		4.02		0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	11.1		48.2		32.1		25.3		9.60		61.4		7	170		
	Barium	mg/kg	EPA 6020	205		324		324		554		164		985		--	--		
	Chromium	mg/kg	EPA 6020	64.8		142		170		147		112		918		90	900		
	Copper	mg/kg	EPA 6020	268		892		872		142		88.9		2,340		149	1,490		
	Lead	mg/kg	EPA 6020	518		1,550		3,200		3,700		611		2,990		17	913		
	Manganese	mg/kg	EPA 6020	811		1,810		1,840		1,250		4,310		3,290		1,100	11,000		
	Nickel	mg/kg	EPA 6020	63.8	J	164		117		75.3		70.5		1,590		36	486		
	Selenium	mg/kg	EPA 6020	0.205	J	0.732	J	0.978	J	0.207	J	0.199	J	0.971		2	Bkgd		
	Silver	mg/kg	EPA 6020	0.381	J	1.260	J	0.555	J	0.518	J	0.227	J	2.26		5	50		
	Zinc	mg/kg	EPA 6020	1,000		7,540		3,740		1,940		479		8,820		315	3,150		

Please refer to notes at end of table.

Table C-19

Ecological Health Sediment - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	18.9		2.73		2.89		1.94		3.20		0.0907	J	0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	68.9		55.9		26.7		24.2		24.4		2.93		7	170		
	Barium	mg/kg	EPA 6020	788		214		561		449		328		111		--	--		
	Chromium	mg/kg	EPA 6020	569		353		284		222		249		23.5		90	900		
	Copper	mg/kg	EPA 6020	1,740		2,270		1,710		1,230		1,170		24.3		149	1,490		
	Lead	mg/kg	EPA 6020	4,160		2,550		2,160		1,390		1,500		11.3		17	913		
	Manganese	mg/kg	EPA 6020	2,820		3,170		1,610		2,220		2,230		346		1,100	11,000		
	Nickel	mg/kg	EPA 6020	1,040		356		388		241		251		23.3		36	486		
	Selenium	mg/kg	EPA 6020	0.642		28.1		0.563		0.398		0.0938		0.0564	J	2	Bkgd		
	Silver	mg/kg	EPA 6020	2.36		1.96		1.72		1.45		0.844		0.169	J	5	50		
Zinc	Zinc	mg/kg	EPA 6020	7,110		7,960		9,470		4,640		3,380		83.8		315	3,150		

Please refer to notes at end of table.

Table C-19

Ecological Health Sediment - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.279		0.361		0.07	Bkgd		
	Arsenic	mg/kg	EPA 6020	5.74		4.55		7	170		
	Barium	mg/kg	EPA 6020	154		140		--	--		
	Chromium	mg/kg	EPA 6020	30.6		27.8		90	900		
	Copper	mg/kg	EPA 6020	43.9		34.3		149	1,490		
	Lead	mg/kg	EPA 6020	114		22.7		17	913		
	Manganese	mg/kg	EPA 6020	540		487		1,100	11,000		
	Nickel	mg/kg	EPA 6020	29.3		26.5		36	486		
	Selenium	mg/kg	EPA 6020	0.0119	U	0.0316	J	2	Bkgd		
	Silver	mg/kg	EPA 6020	0.327	J	0.379	J	5	50		
	Zinc	mg/kg	EPA 6020	200		112		315	3,150		

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. Highlighting indicates a concentration above the primary screening level

7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-20

Ecological Health Sediment - Composite Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	8.38			3.21	
	Arsenic	mg/kg	EPA 6020	37.9			28.5	
	Barium	mg/kg	EPA 6020	758			415	
	Chromium	mg/kg	EPA 6020	282			358	
	Copper	mg/kg	EPA 6020	2,010			941	
	Lead	mg/kg	EPA 6020	2,610			2,660	
	Manganese	mg/kg	EPA 6020	2,060			2,240	
	Nickel	mg/kg	EPA 6020	507			342	
	Selenium	mg/kg	EPA 6020	1.32	J		0.436	
	Silver	mg/kg	EPA 6020	2.52	J		1.28	
	Zinc	mg/kg	EPA 6020	7,670			4,270	
							4,380	
								315

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.

7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010		9/8/2010				
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15		0				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PBBs	Aroclor 1254	µg/kg	EPA 8082	97.1	U	39.5	J	30.0	J	4.14	J	2.24	U	2,360		300	3,000			
	Aroclor 1260	µg/kg	EPA 8082	1,020		4.02	U	4.16	U	2.15	U	2.24	U	197		200	2,000			
	Total PCBs	µg/kg	EPA 8082	1,857		59.1	J	30.0	J	4.14	J	4.5	U	2,360		22	220			

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration				
Sample Date				9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010						
Depth (Feet Below Ground Surface)				5 - 10	0 - 5	10 - 15	0	0 - 5	0						
				Result	Flag	Result	Flag	Result	Flag						
PBBs	Aroclor 1254	µg/kg	EPA 8082	200		121	J	1.81	U	16,100		1,160		300	3,000
	Aroclor 1260	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	200	2,000
	Total PCBs	µg/kg	EPA 8082	200		215	J	3.6	U	16,100		1,932		22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag								
PBBs	Aroclor 1254	µg/kg	EPA 8082	373	U	14,600	J	4,840		84.6		49.1		1.93	U	300	3,000
	Aroclor 1260	µg/kg	EPA 8082	373	U	882	U	375		18.1	U	3.93	U	2.07	J	200	2,000
	Total PCBs	µg/kg	EPA 8082	5,710		14,600	J	5,758		84.6		59.7		2.07	J	22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/19/2003	12/19/2003		12/19/2003	12/19/2003			
Depth (Feet Below Ground Surface)				0.5	2.5		2.5 DUP		0.5	1.5			
PBBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	380		250		2350		340	
	Aroclor 1260	µg/kg	EPA 8082	78.9		128		84.6		614		218	
	Total PCBs	µg/kg	EPA 8082	78.9		508		334.6		2964		558	

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2	
PBBs	Aroclor 1254	µg/kg	EPA 8082	462		1230		ND	U	ND	U	300	3,000
	Aroclor 1260	µg/kg	EPA 8082	214		411		463		92		200	2,000
	Total PCBs	µg/kg	EPA 8082	676		1641		463.00		92.10		22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date	12/17/2003	12/17/2003	12/16/2003		
				Depth (Feet Below Ground Surface)	0.5	2.5	2		
				Result	Flag	Result	Flag		
PBBs	Aroclor 1254	µg/kg	EPA 8082	332		ND	U	3570	3,000
	Aroclor 1260	µg/kg	EPA 8082	330		ND	U	ND	2,000
	Total PCBs	µg/kg	EPA 8082	662		ND		3570	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5						
PBBs	Aroclor 1254	µg/kg	EPA 8082	281		7080		5170		24900		300	3,000
	Aroclor 1260	µg/kg	EPA 8082	153		3110		ND		6060		200	2,000
	Total PCBs	µg/kg	EPA 8082	434		10,190		5170		30960		22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag		
PBBs	Aroclor 1254	µg/kg	EPA 8082	122		ND	U	ND	U	300	3,000
	Aroclor 1260	µg/kg	EPA 8082	90.7		ND	U	ND	U	200	2,000
	Total PCBs	µg/kg	EPA 8082	212.7		ND		ND		22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
PBBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	300	3,000
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	200	2,000
	Total PCBs	µg/kg	EPA 8082	ND		ND		ND		22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004			
Depth (Feet Below Ground Surface)				0.5	2.5	5			
PBBs	Aroclor 1254	µg/kg	EPA 8082	4,920		6,090		ND	U
	Aroclor 1260	µg/kg	EPA 8082	1,150		1,300		ND	U
	Total PCBs	µg/kg	EPA 8082	6,070		7,390		ND	U
								300	3,000
								200	2,000
								22	220

Please refer to notes at end of table.

Table C-21

Ecological Health Sediment - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
Depth (Feet Below Ground Surface)				0.5	2.5		5							
				Result	Flag	Result	Flag	Result	Flag					
PBBs	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	300	3,000			
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	200	2,000			
	Total PCBs	µg/kg	EPA 8082	ND		ND		ND		22	220			

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-22

Ecological Health Sediment - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	660	J	3,790		135	J	1,070		52.2	J	11,200		300	3,000		
	Aroclor 1260	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	200	2,000		
	Total PCBs	µg/kg	EPA 8082	966	J	4,950	J	325	J	1,584	J	98.4	J	14,160	J	22	220		

Please refer to notes at end of table.

Table C-22

Ecological Health Sediment - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	24700	J	3920		11400		12000		24500		4.96		300	3,000		
	Aroclor 1260	µg/kg	EPA 8082	2030	U	368	U	996	U	947	U	2090	U	2.67	J	200	2,000		
	Total PCBs	µg/kg	EPA 8082	31180	J	4940	J	15760	J	14310	J	28340	J	7.63	J	22	220		

Please refer to notes at end of table.

Table C-22

Ecological Health Sediment - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	14.6		2.15	U	300	3,000
	Aroclor 1260	µg/kg	EPA 8082	14.5		9.8		200	2,000
	Total PCBs	µg/kg	EPA 8082	29.1		9.8		22	220

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-23

Ecological Health Sediment - Composite Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010	10/15/2010	
				Result	Flag	Result	Flag	
PCBs	Aroclor 1254	µg/kg	EPA 8082	14700	J	4780	J	300
	Aroclor 1260	µg/kg	EPA 8082	1030	U	394	U	200
	Total PCBs	µg/kg	EPA 8082	14700	J	4780	J	220

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Screening Level	Preliminary Hot Spot Concentration					
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010								
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15		0						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	761		47.3	J	264		6.51	J	4.45	U	48.7	J	200	2,000					
	Acenaphthene	µg/kg	EPA 8270M	249		19.7	U	800		15.1	J	4.45	U	26.5	J	300	3,000					
	Acenaphthylene	µg/kg	EPA 8270M	535		19.7	U	1,470		5.47	J	4.45	U	35.0	J	200	2,000					
	Anthracene	µg/kg	EPA 8270M	694		19.7	U	4,150		44.6		4.45	U	73.6	J	845	8,450					
	Benz(a)anthracene	µg/kg	EPA 8270M	2,460		62.0	J	8,960		83.4		9.32	J	345		1,050	10,500					
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,700		97.1		8,740		90.5		10.9	J	430		1,450	14,500					
	Be nz(b)fluoranthene	µg/kg	EPA 8270M	2,250		124		6,270		61.6		11.7	J	472		6,700	67,000					
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1,710		94.1		6,760		51.5		8.68	J	468		300	3,000					
	Benzo(k)fluranthene	µg/kg	EPA 8270M	1,950		69.6	J	5,830		68.5		11.7	J	412		6,700	67,000					
	Chrysene	µg/kg	EPA 8270M	2,840		102		9,990		97.1		17.9	J	475		1,290	12,900					
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	489		21.2	J	1,480		16.2	J	4.45	U	113		1,300	13,000					
	Fluoranthene	µg/kg	EPA 8270M	5,710		107		18,600		242		33.4		546		2,230	22,300					
	Fluorene	µg/kg	EPA 8270M	457		19.7	U	1,270		19.6		4.54	J	28.5	J	536	5,360					
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1,400		65.9	J	5,100		47.8		7.77	J	372		100	1,000					
	Naphthalene	µg/kg	EPA 8270M	1,020		52.7	J	308		20.5		4.45	U	65.6	J	561	5,610					
	Phenanthrene	µg/kg	EPA 8270M	2,380		80.1	J	18,100		150		42.4		298		1,170	11,700					
	Pyrene	µg/kg	EPA 8270M	5,040		126		24,200		268		37.7		577		1,520	15,200					
	LPAHs	µg/kg	--	6,100		260		26,360		260		70		580		1,400	--					
	HPAHs	µg/kg	--	26,550		870		95,930		1,030		150		4,210		6,700	--					
	Total PAHs	µg/kg	--	32,650		1,130		122,290		1,290		220		4,790		22,800	--					
	BaP Eq	µg/kg	--	3,840		150		12,390		130		20		670		1,450	14,500					

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS		090810-3-3.4-10-02-FS		100510-3-3.5-05-01-FS		100610-3-3.6-15-03 FS		100710-3-3.7-Surface -11FS		100710-3-3.7-5-01-FS		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		9/8/2010		9/8/2010		10/5/2010		10/6/2010		10/7/2010						
				Depth (Feet Below Ground Surface)		5 - 10		10 - 15		0 - 5		10 - 15		0		0 - 5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	386		54.3		27.8	J	3.52	U	77.6	J	20.2	J	200	2,000			
	Acenaphthene	µg/kg	EPA 8270M	49.7	U	20.6	J	27.4	J	3.52	U	56.8	J	17.9	U	300	3,000			
	Acenaphthylene	µg/kg	EPA 8270M	108	J	63.3		28.4	J	3.65	J	98.6	J	25.7	J	200	2,000			
	Anthracene	µg/kg	EPA 8270M	153	J	61.9		54.1		3.52	U	406		38.4	J	845	8,450			
	Benz(a)anthracene	µg/kg	EPA 8270M	1,280		382		339		4.41	J	1,270		144		1,050	10,500			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,090		646		316		7.02	J	986		214		1,450	14,500			
	Be nz(b)fluoranthene	µg/kg	EPA 8270M	2,590		765		742		4.26	J	1,020		204		6,700	67,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,960		811		388		6.16	J	1,010		230		300	3,000			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	2,010		672		391		4.96	J	831		152		6,700	67,000			
	Chrysene	µg/kg	EPA 8270M	2,050		778		925		5.81	J	1,430		207		1,290	12,900			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	718		203		97.8		3.52	U	225		57.4	J	1,300	13,000			
	Fluoranthene	µg/kg	EPA 8270M	1,220		799		488		10.0	J	3,100		218		2,230	22,300			
	Fluorene	µg/kg	EPA 8270M	121	J	21.0	J	23.0	J	3.52	U	75.4	J	17.9	U	536	5,360			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,070		640		303		4.41	J	749		176		100	1,000			
	Naphthalene	µg/kg	EPA 8270M	266		86.2		42.1		17.3		106	J	38.3	J	561	5,610			
	Phenanthrene	µg/kg	EPA 8270M	585		380		193		9.16	J	1,520		154		1,170	11,700			
	Pyrene	µg/kg	EPA 8270M	1,780		943		586		13.6	J	2,840		256		1,520	15,200			
	LPAHs	µg/kg	--	1,670		690		390		50		2,340		310		1,400	--			
	HPAHs	µg/kg	--	18,770		6,640		4,580		60		13,460		1,860		6,700	--			
	Total PAHs	µg/kg	--	20,440		7,330		4,970		110		15,800		2,170		22,800	--			
	BaP Eq	µg/kg	--	3,450		1,040		560		12		1,530		330		1,450	14,500			

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10-TOB		100610-3-3.8-5-01-FS		100710-3-3.9-Surface-10-FS		100710-3-3.9-5-01-FS		100710-3-3.10-Surface -11-WS		100710-3-3.10-5-01-FS		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/6/2010		10/6/2010		10/7/2010		10/7/2010		10/7/2010					
				Depth (Feet Below Ground Surface)		0		0 - 5		0		0 - 5		0		0 - 5			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	82.9	J	60.3	J	20.6		44.4		28.7	J	5.30	J	200	2,000		
	Acenaphthene	µg/kg	EPA 8270M	15.7	J	85.5		13.7		78.3		12.8	J	3.87	UJ	300	3,000		
	Acenaphthylene	µg/kg	EPA 8270M	71.7	J	53.3	J	31.1		40.8		29.6		10.3	J	200	2,000		
	Anthracene	µg/kg	EPA 8270M	105	J	142		53.3		273		43.7		12.1	J	845	8,450		
	Benz(a)anthracene	µg/kg	EPA 8270M	281	J	653		155		634		182		35.3	J	1,050	10,500		
	Benz(a)pyrene	µg/kg	EPA 8270M	366	J	681		199		657		300		45.3	J	1,450	14,500		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	409	J	723		185		637		299		37.1	J	6,700	67,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	430	J	644		210		570		361		45.6	J	300	3,000		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	296	J	576		138		562		205		30.4	J	6,700	67,000		
	Chrysene	µg/kg	EPA 8270M	443	J	877		212		753		261		46.8	J	1,290	12,900		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	94.1	J	173		43.8		151		65.6		8.69	J	1,300	13,000		
	Fluoranthene	µg/kg	EPA 8270M	562	J	1,630		283		1,450		313		65.2	J	2,230	22,300		
	Fluorene	µg/kg	EPA 8270M	21.9	J	77.4		15.5		74.6		15.1	J	3.87	UJ	536	5,360		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	322	J	524		164		473		270		33.6	J	100	1,000		
	Naphthalene	µg/kg	EPA 8270M	142	J	104		27.8		76.5		43.4		19.2	J	561	5,610		
	Phenanthrene	µg/kg	EPA 8270M	453	J	1,160		161		961		157		39.8	J	1,170	11,700		
	Pyrene	µg/kg	EPA 8270M	711	J	1,310		314		1,260		430		80.6	J	1,520	15,200		
	LPAHs	µg/kg	--	900		1,680		330		1,550		330		90		1,400	--		
	HPAHs	µg/kg	--	3,910		7,790		1,900		7,150		2,690		430		6,700	--		
	Total PAHs	µg/kg	--	4,810		9,470		2,230		8,700		3,020		520		22,800	--		
	BaP Eq	µg/kg	--	570		1,060		300		990		450		70		1,450	14,500		

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration	
			Sample Date	10/7/2010			
			Depth (Feet Below Ground Surface)	5 - 10			
				Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	36.4		200	2,000
	Acenaphthene	µg/kg	EPA 8270M	31.8		300	3,000
	Acenaphthylene	µg/kg	EPA 8270M	19.4		200	2,000
	Anthracene	µg/kg	EPA 8270M	24.5		845	8,450
	Benzo(a)anthracene	µg/kg	EPA 8270M	17.8		1,050	10,500
	Benzo(a)pyrene	µg/kg	EPA 8270M	24.6		1,450	14,500
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	19.8		6,700	67,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.4		300	3,000
	Benzo(k)fluranthene	µg/kg	EPA 8270M	15.8		6,700	67,000
	Chrysene	µg/kg	EPA 8270M	23.6	U	1,290	12,900
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	3.78		1,300	13,000
	Fluoranthene	µg/kg	EPA 8270M	83.9		2,230	22,300
	Fluorene	µg/kg	EPA 8270M	22.8		536	5,360
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.6	J	100	1,000
	Naphthalene	µg/kg	EPA 8270M	120		561	5,610
	Phenanthrene	µg/kg	EPA 8270M	104		1,170	11,700
	Pyrene	µg/kg	EPA 8270M	102		1,520	15,200
	LPAHs	µg/kg		--		1,400	--
	HPAHs	µg/kg		--		6,700	--
	Total PAHs	µg/kg		--		22,800	--
	BaP Eq	µg/kg		--		1,450	14,500

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5		1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	200	2,000		
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	300	3,000		
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	200	2,000		
	Anthracene	µg/kg	EPA 8270M	17.4		ND	U	ND	U	ND	U	ND	U	845	8,450		
	Benzo(a)anthracene	µg/kg	EPA 8270M	47.9		22.6		32.8		244		205		1,050	10,500		
	Benzo(a)pyrene	µg/kg	EPA 8270M	38.4		10.1		20.2		126		106		1,450	14,500		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	62.8		10.1		24.4		169		ND	U	6,700	67,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	34		10	U	18.5		219		139		300	3,000		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	13.9		10	U	10.1		ND	U	ND	U	6,700	67,000		
	Chrysene	µg/kg	EPA 8270M	41.8		10	U	11.8		ND	U	ND	U	1,290	12,900		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	11.3		ND	U	ND	U	ND	U	ND	U	1,300	13,000		
	Fluoranthene	µg/kg	EPA 8270M	69.7		10.9		30.3		253		106		2,230	22,300		
	Fluorene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	536	5,360		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	30.5		10	U	15.1		118		ND	U	100	1,000		
	Naphthalene	µg/kg	EPA 8270M	11.3		15.1		12.6		ND	U	ND	U	561	5,610		
	Phenanthrene	µg/kg	EPA 8270M	43.6		10.9		27.8		228		ND	U	1,170	11,700		
	Pyrene	µg/kg	EPA 8270M	68		16.8		51.3		337		115		1,520	15,200		
	LPAHs	µg/kg	--	70		30		40		220		0		1,400	--		
	HPAHs	µg/kg	--	420		110		210		1470		670		6,700	--		
	Total PAHs	µg/kg	--	490		140		250		1690		670		22,800	--		
	BaP Eq	µg/kg	--	60		10		30		180		130		1,450	14,500		

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/18/2003	12/18/2003	12/18/2003		12/18/2003	12/18/2003					
				Depth (Feet Below Ground Surface)		0.5	2	0.5		2						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200	2,000			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	300	3,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	200	2,000			
	Anthracene	µg/kg	EPA 8270M	135		261		ND	U	ND	U	845	8,450			
	Benz(a)anthracene	µg/kg	EPA 8270M	499		1040		404		142		1,050	10,500			
	Benzo(a)pyrene	µg/kg	EPA 8270M	467		988		311		109		1,450	14,500			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	602		877		404		150		6,700	67,000			
	Benzo(k)fluoranthene	µg/kg	EPA 8270M	348		664		278		112		300	3,000			
	Chrysene	µg/kg	EPA 8270M	261		340		160		101		6,700	67,000			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	578		1640		219		86.1		1,290	12,900			
	Fluoranthene	µg/kg	EPA 8270M	720		1190		539		112		2,230	22,300			
	Fluorene	µg/kg	EPA 8270M	ND		111		ND		ND		536	5,360			
	Fluoranthene, 1,4,5-trimethyl-	µg/kg	EPA 8270M	301		450		219		52.4		100	1,000			
	Naphthalene	µg/kg	EPA 8270M	ND		253		ND		ND		561	5,610			
	Phenanthrene	µg/kg	EPA 8270M	459		1220		185		711		1,170	11,700			
	Pyrene	µg/kg	EPA 8270M	689		2040		463		195		1,520	15,200			
	LPAHs	µg/kg	--	590		1840		180		710		1,400	--			
	HPAHs	µg/kg	--	4470		9230		3000		1060		6,700	--			
	Total PAHs	µg/kg	--	5060		11070		3180		1770		22,800	--			
	BaP Eq	µg/kg	--	610		1240		420		150		1,450	14,500			

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/17/2003	12/17/2003		12/16/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	2								
				Result	Flag	Result	Flag	Result	Flag					
PAHs	Methylanthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200	2,000			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	32.1		ND	U	300	3,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	36.5		ND	U	200	2,000			
	Anthracene	µg/kg	EPA 8270M	ND	U	343		ND	U	845	8,450			
	Benz(a)anthracene	µg/kg	EPA 8270M	86.1		532		270		1,050	10,500			
	Benzo(a)pyrene	µg/kg	EPA 8270M	115		903		314		1,450	14,500			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	118		512		326		6,700	67,000			
	Benzo(k)fluoranthene	µg/kg	EPA 8270M	117		1130		196		300	3,000			
	Chrysene	µg/kg	EPA 8270M	83.1		462		239	U	6,700	67,000			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	109		684		344	U	1,290	12,900			
	Fluoranthene	µg/kg	EPA 8270M	ND	U	19.5		ND	U	1,300	13,000			
	Fluorene	µg/kg	EPA 8270M	156		2480		400		2,230	22,300			
	Fluoranthene, 1,4,5-trimethyl-	µg/kg	EPA 8270M	86.9		703		164		536	5,360			
	Naphthalene	µg/kg	EPA 8270M	ND	U	48.2		ND	U	100	1,000			
	Phenanthrene	µg/kg	EPA 8270M	79.3		2230		183		561	5,610			
	Pyrene	µg/kg	EPA 8270M	191		3350		607		1,170	11,700			
	LPAHs	µg/kg	--	80		2710		180		1,520	15,200			
	HPAHs	µg/kg	--	1060		10780		2,860		2,860	--			
	Total PAHs	µg/kg	--	1140		13490		3,040		22,800	--			
	BaP Eq	µg/kg	--	150		1110		390		1,450	14,500			

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004		2/24/2004			
				Depth (Feet Below Ground Surface)		0.5	2	0.5	2.5	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	10,300		200	2,000
	Acenaphthene	µg/kg	EPA 8270M	ND	U	41.3		ND	U	26900		300	3,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	191		ND	U	647		200	2,000
	Anthracene	µg/kg	EPA 8270M	ND		178		143		23300		845	8,450
	Benzo(a)anthracene	µg/kg	EPA 8270M	81.9		579		492		20800		1,050	10,500
	Benzo(a)pyrene	µg/kg	EPA 8270M	110		712		478		12400		1,450	14,500
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	109		572		410		10900		6,700	67,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	132		816		331		1660		300	3,000
	Benzo(k)fluranthene	µg/kg	EPA 8270M	105		617		413		12900		6,700	67,000
	Chrysene	µg/kg	EPA 8270M	111		719		571		24500		1,290	12,900
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	150		90		844		1,300	13,000
	Fluoranthene	µg/kg	EPA 8270M	150		1250		872		50500		2,230	22,300
	Fluorene	µg/kg	EPA 8270M	ND	U	125		ND	U	20300		536	5,360
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	91		571		268		1870		100	1,000
	Naphthalene	µg/kg	EPA 8270M	ND	U	357		ND	U	10900		561	5,610
	Phenanthrene	µg/kg	EPA 8270M	88.5		1250		577		75900		1,170	11,700
	Pyrene	µg/kg	EPA 8270M	166		1690		1190		53500		1,520	15,200
	LPAHs	µg/kg	--	80		2140		720		168250		1,400	--
	HPAHs	µg/kg	--	1060		7680		5120		189870		6,700	--
	Total PAHs	µg/kg	--	1140		9820		5840		358120		22,800	--
	BaP Eq	µg/kg	--	140		1050		690		16770		1,450	14,500

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003		12/22/2003							
				Depth (Feet Below Ground Surface)		0.5		2.5		2					
				Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200	2,000				
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	300	3,000				
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200	2,000				
	Anthracene	µg/kg	EPA 8270M	ND	U	22.7		ND	U	845	8,450				
	Benzo(a)anthracene	µg/kg	EPA 8270M	50.4		70.6		27.1		1,050	10,500				
	Benzo(a)pyrene	µg/kg	EPA 8270M	30.7		46.3		23.8		1,450	14,500				
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	48.8		57.6		19.7		6,700	67,000				
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.6		27.6		16.4		300	3,000				
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		33.3		21.3		6,700	67,000				
	Chrysene	µg/kg	EPA 8270M	19.7		27.6		19.7		1,290	12,900				
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND		1,300	13,000				
	Fluoranthene	µg/kg	EPA 8270M	30		77.9		13.9		2,230	22,300				
	Fluorene	µg/kg	EPA 8270M	ND	U	10.6		ND	U	536	5,360				
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.9		23.5		ND	U	100	1,000				
	Naphthalene	µg/kg	EPA 8270M	19.7	U	ND	U	ND	U	561	5,610				
	Phenanthrene	µg/kg	EPA 8270M	27.5		68.2		ND	U	1,170	11,700				
	Pyrene	µg/kg	EPA 8270M	76.3		124		41.8		1,520	15,200				
	LPAHs	µg/kg	--	50		100		0		1,400	1,400				
	HPAHs	µg/kg	--	290		490		180		6,700	6,700				
	Total PAHs	µg/kg	--	340		590		180		22,800	22,800				
	BaP Eq	µg/kg	--	40		60		30		1,450	14,500				

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)	0.5	2	0.5							
				Result	Flag	Result	Flag	Result	Flag					
PAHs	Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200	2,000			
	Acenaphthene	µg/kg	EPA 8270M	50.6		ND	U	ND	U	300	3,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	200	2,000			
	Anthracene	µg/kg	EPA 8270M	64.7		ND	U	132		845	8,450			
	Benz(a)anthracene	µg/kg	EPA 8270M	1340		73.2		2890		1,050	10,500			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2380		97.7		4030		1,450	14,500			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2280		119		4070		6,700	67,000			
	Benzo(k)fluoranthene	µg/kg	EPA 8270M	1180		101		3120		300	3,000			
	Chrysene	µg/kg	EPA 8270M	3230		61.8		3590		6,700	67,000			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	2730		95.2		3990		1,290	12,900			
	Fluoranthene	µg/kg	EPA 8270M	486		27.7		1320		1,300	13,000			
	Fluorene	µg/kg	EPA 8270M	1240		61.8		2910		2,230	22,300			
	Fluoranthene, 1,4,5-trimethyl-	µg/kg	EPA 8270M	35.7		ND		ND		536	5,360			
	Naphthalene	µg/kg	EPA 8270M	1280		85.4		2920		100	1,000			
	Phenanthrene	µg/kg	EPA 8270M	93.7		22		ND		561	5,610			
	Pyrene	µg/kg	EPA 8270M	477		35		762		1,170	11,700			
	LPAHs	µg/kg	--	1310		84.6		3170		1,520	15,200			
	HPAHs	µg/kg	--	720		50		890		1,400	--			
	Total PAHs	µg/kg	--	17460		810		32010		6,700	--			
	BaP Eq	µg/kg	--	18180		860		32900		22,800	--			
		--	--	3400		150		6410		1,450	14,500			

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		0.5		2.5		5			
				Depth (Feet Below Ground Surface)		0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200		2,000	
	Acenaphthene	µg/kg	EPA 8270M	ND	U	52.3		40.3		300		3,000	
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	1270		ND		200		2,000	
	Anthracene	µg/kg	EPA 8270M	ND	U	744		45.6		845		8,450	
	Benzo(a)anthracene	µg/kg	EPA 8270M	242		3010		334		1,050		10,500	
	Benzo(a)pyrene	µg/kg	EPA 8270M	ND		3270		446		1,450		14,500	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	10.8		2830		605		6,700		67,000	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	ND		2840		212		300		3,000	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		3660		313		6,700		67,000	
	Chrysene	µg/kg	EPA 8270M	ND		3470		539		1,290		12,900	
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	381		71.5		1,300		13,000	
	Fluoranthene	µg/kg	EPA 8270M	10.8		6790		321		2,230		22,300	
	Fluorene	µg/kg	EPA 8270M	ND	U	208		27.4		536		5,360	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	ND		2020		218		100		1,000	
	Naphthalene	µg/kg	EPA 8270M	ND	U	204		49.5		561		5,610	
	Phenanthrene	µg/kg	EPA 8270M	ND		4380		189		1,170		11,700	
	Pyrene	µg/kg	EPA 8270M	20.9		10800		495		1,520		15,200	
	LPAHs	µg/kg	--	0		6860		360		1,400		--	
	HPAHs	µg/kg	--	280		39070		3550		6,700		--	
	Total PAHs	µg/kg	--	280		45930		3910		22,800		--	
	BaP Eq	µg/kg	--	30		4510		640		1,450		14,500	

Please refer to notes at end of table.

Table C-24

Ecological Health Sediment - Boring Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5	5	Result	Flag	Result	Flag	Result	Flag
PAHs	Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		200	2,000	
	Acenaphthene	µg/kg	EPA 8270M	ND	U	322			ND	U	300	3,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	102			ND	U	200	2,000
	Anthracene	µg/kg	EPA 8270M	44.1		429			11.6		845	8,450
	Benz(a)anthracene	µg/kg	EPA 8270M	84.2		543			26.2		1,050	10,500
	Benzo(a)pyrene	µg/kg	EPA 8270M	40.9		338			11.6		1,450	14,500
	Benz(b)fluoranthene	µg/kg	EPA 8270M	75.4		338			11.6		6,700	67,000
	Benz(e)fluoranthene	µg/kg	EPA 8270M	46.5		169			ND	U	300	3,000
	Benz(a)fluoranthene	µg/kg	EPA 8270M	78.6		177			ND	U	6,700	67,000
	Chrysene	µg/kg	EPA 8270M	120		1400			ND	U	1,290	12,900
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U		ND	U	1,300	13,000
	Fluoranthene	µg/kg	EPA 8270M	64.2		544			41.7		2,230	22,300
	Fluorene	µg/kg	EPA 8270M	ND	U	940			10		536	5,360
	Fluoranthene, 1,4,5-trimethyl-	µg/kg	EPA 8270M	26.5		66.8			ND	U	100	1,000
	Naphthalene	µg/kg	EPA 8270M	ND	U	ND	U		56.3		561	5,610
	Phenanthrene	µg/kg	EPA 8270M	43.3		1190			50.9		1,170	11,700
	Pyrene	µg/kg	EPA 8270M	93.1		2170			61		1,520	15,200
	LPAHs	µg/kg	--	90		2980			130		1,400	--
	HPAHs	µg/kg	--	630		5750			150		6,700	--
	Total PAHs	µg/kg	--	720		8730			280		22,800	--
	BaP Eq	µg/kg	--	60		440			20		1,450	14,500

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-25

Ecological Health Sediment - Surface Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	112		80.3		76.0		39.3		22.0	J	91.8		200	2,000		
	Acenaphthene	µg/kg	EPA 8270M	130		101		7.50	J	13.4		9.8	J	51.4		300	3,000		
	Acenaphthylene	µg/kg	EPA 8270M	63.1	J	86.6		23.9	J	43.9		14.8	J	37.2		200	2,000		
	Anthracene	µg/kg	EPA 8270M	214		286		43.4		30.1		23.4	J	115		845	8,450		
	Benzo(a)anthracene	µg/kg	EPA 8270M	428		1,370		106		127		139		318		1,050	10,500		
	Benzo(a)pyrene	µg/kg	EPA 8270M	501		967		149		206		244		426		1,450	14,500		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	477		1,570		134		257		240		469		6,700	67,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	483		861		357		327		289		581		300	3,000		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	372		969		105		180		177		372		6,700	67,000		
	Chrysene	µg/kg	EPA 8270M	550		2,180		179		318		217		428		1,290	12,900		
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	109		280		47.5		56.0		72.2		131		1,300	13,000		
	Fluoranthene	µg/kg	EPA 8270M	877		1,870		216		637		234		637		2,230	22,300		
	Fluorene	µg/kg	EPA 8270M	113		103		11.2	J	32.8		12.7	J	43.5		536	5,360		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	361		700		152		216		228		409		100	1,000		
	Naphthalene	µg/kg	EPA 8270M	125		150		55.9		124		26.2	J	117		561	5,610		
	Phenanthrene	µg/kg	EPA 8270M	1,070		1,110		212		697		191		394		1,170	11,700		
	Pyrene	µg/kg	EPA 8270M	924		1,670		259		758		288		618		1,520	15,200		
	LPAHs	µg/kg	--	1,830		1,910		430		980		300		850		1,400	--		
	HPAHs	µg/kg	--	5,080		12,440		1,700		3,080		2,130		4,390		6,700	--		
	Total PAHs	µg/kg	--	6,910		14,350		2,130		4,060		2,430		5,240		22,800	--		
	BaP Eq	µg/kg	--	750		1,630		240		330		380		690		1,450	14,500		

Please refer to notes at end of table.

Table C-25

Ecological Health Sediment - Surface Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	192		44.3		94.1		56.6		31.6	J	12.1	J	200	2,000		
	Acenaphthene	µg/kg	EPA 8270M	291		23.4	J	116		20.4	J	17.2	J	5.36	J	300	3,000		
	Acenaphthylene	µg/kg	EPA 8270M	166		26.6	J	104		183		34.7		8.73	J	200	2,000		
	Anthracene	µg/kg	EPA 8270M	2,000		65.3		604		165		60.1		9.12	J	845	8,450		
	Benzo(a)anthracene	µg/kg	EPA 8270M	5,870		231		1,800		559		210		16.3		1,050	10,500		
	Benzo(a)pyrene	µg/kg	EPA 8270M	3,970		284		1,680		705		278		18.7		1,450	14,500		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	4,060		316		1,710		597		260		42.5		6,700	67,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,730		295		1,210		748		315		21.3		300	3,000		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3,450		219		1,370		467		236		18.8		6,700	67,000		
	Chrysene	µg/kg	EPA 8270M	6,390		316		1,990		685		283		36.6		1,290	12,900		
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	874		71.3		300		135		66.8		4.39	J	1,300	13,000		
	Fluoranthene	µg/kg	EPA 8270M	10,300		393		3,910		1150		368		41.0		2,230	22,300		
	Fluorene	µg/kg	EPA 8270M	366		21.4	J	123		34.0		15.8	J	8.12	J	536	5,360		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,430		221		1,010		540		238		15.7		100	1,000		
	Naphthalene	µg/kg	EPA 8270M	401		56.5		169		111		54.1		33.8		561	5,610		
	Phenanthrene	µg/kg	EPA 8270M	7,490		198		2,080		720		188		35.5		1,170	11,700		
	Pyrene	µg/kg	EPA 8270M	11,200		402		3,790		1340		390		41.0		1,520	15,200		
	LPAHs	µg/kg	--	10,910		430		3,290		1,290		410		110		1,400	--		
	HPAHs	µg/kg	--	51,270		2,750		18,770		6,930		2,640		260		6,700	--		
	Total PAHs	µg/kg	--	62,180		3,180		22,060		8,220		3,050		370		22,800	--		
	BaP Eq	µg/kg	--	6,150		440		2,460		1,020		420		30		1,450	14,500		

Please refer to notes at end of table.

Table C-25

Ecological Health Sediment - Surface Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	9.36	J	4.94	J	200	2,000		
	Acenaphthene	µg/kg	EPA 8270M	3.92	U	4.23	U		3,000		
	Acenaphthylene	µg/kg	EPA 8270M	9.18	J	10.3	J	200	2,000		
	Anthracene	µg/kg	EPA 8270M	9.18	J	6.47	J		8,450		
	Benz(a)anthracene	µg/kg	EPA 8270M	25.6		20.1		1,050	10,500		
	Benzo(a)pyrene	µg/kg	EPA 8270M	32.1		28.5			14,500		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	40.2		24.5		6,700	67,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	29.1		27.9			3,000		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	31.2		20.8		6,700	67,000		
	Chrysene	µg/kg	EPA 8270M	44.7		27.6			12,900		
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	6.82	J	5.53	J	1,300	13,000		
	Fluoranthene	µg/kg	EPA 8270M	66.2		34.0			22,300		
	Fluorene	µg/kg	EPA 8270M	5.82	J	4.23	U	536	5,360		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	23.6		21.4			1,000		
	Naphthalene	µg/kg	EPA 8270M	27.2		16.1	J	561	5,610		
	Phenanthrene	µg/kg	EPA 8270M	55.1		24.5			11,700		
	Pyrene	µg/kg	EPA 8270M	57.6		48.1		1,170	15,200		
	LPAHs	µg/kg	--	120		70			--		
	HPAHs	µg/kg	--	360		260		1,520	--		
	Total PAHs	µg/kg	--	480		330			--		
	BaP Eq	µg/kg	--	50		40		22,800	--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-26

Ecological Health Sediment - Composite Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	63.9			77.1	
	Acenaphthene	µg/kg	EPA 8270M	26.2	J	22.0	56.6	300
	Acenaphthylene	µg/kg	EPA 8270M	31.1	J	31.3	44.1	200
	Anthracene	µg/kg	EPA 8270M	78.9		74.4	128	845
	Benzo(a)anthracene	µg/kg	EPA 8270M	202		225	394	1,050
	Benzo(a)pyrene	µg/kg	EPA 8270M	280		280	447	1,450
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	308		289	417	6,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	342		361	474	300
	Benzo(k)fluranthene	µg/kg	EPA 8270M	267		217	344	6,700
	Chrysene	µg/kg	EPA 8270M	277		317	526	1,290
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	75.3		76.5	112	1,300
	Fluoranthene	µg/kg	EPA 8270M	463		404	724	2,230
	Fluorene	µg/kg	EPA 8270M	27.2	J	23.0	J	536
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	246		257	370	100
	Naphthalene	µg/kg	EPA 8270M	86.6		69.9	118	561
	Phenanthrene	µg/kg	EPA 8270M	265		270	511	1,170
	Pyrene	µg/kg	EPA 8270M	394		433	738	1,520
	LPAHs	µg/kg	--	580		530	980	1,400
	HPAHs	µg/kg	--	2,850		2,860	4,550	6,700
	Total PAHs	µg/kg	--	3,430		3,390	5,530	22,800
	BaP Eq	µg/kg	--	440		440	690	1,450

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7- Surface - 11FS	100710-3-3.7- 5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9- Surface-10-FS	100710-3-3.9- 5-01-FS	Primary Screening Level						
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0							
				Result	Flag	Result	Flag	Result	Flag							
SVOCs	Dibenzofuran	µg/kg	EPA 8082	301	U	152	U	320	U	312	U	148	U	314	U	--

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level
				Sample Date		12/19/2003		12/19/2003		12/19/2003		
Depth (Feet Below Ground Surface)				0.5	2.5	2.5 DUP		0.5	1.5			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level
				Sample Date		12/18/2003		12/18/2003		12/18/2003		
Depth (Feet Below Ground Surface)				0.5	2	0.5	2					
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34			Primary Screening Level
				Sample Date		12/17/2003		12/17/2003		
Depth (Feet Below Ground Surface)				0.5		2.5		2		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	Result	Flag	Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level
				Sample Date		2/24/2004		2/24/2004		2/24/2004		
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5					
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	13,200	--	--

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	--		

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	--		

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level		
				Sample Date		2/24/2004		2/24/2004		2/24/2004		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--		--		

Please refer to notes at end of table.

Table C-27

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--		--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010								
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15								
					Result	Flag	Result	Flag	Result	Flag							
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	766		80.2	U	2070	U	17.0	U	18.1	U	1170		148,000	1,480,000

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03-FS	100710-3-3.7-Surface-11FS	100710-3-3.7-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	0								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	807	U	29.8	U	683		14.3	U	10,000		187	J	148,000	1,480,000

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Surface-11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0								
					Result	Flag	Result	Flag	Result	Flag							
										Result	Flag						
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	10,000		187	J	27,100		773		252		4,610		148,000	1,480,000

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01 FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/7/2010	10/7/2010		
				Depth (Feet Below Ground Surface)	0	0 - 5		
					Result	Flag	Result	Flag
							Result	Flag
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	578		72.2	J	15.3
							U	148,000
								1,480,000

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5		2.5 DUP		0.5		1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	682		ND	U	148,000	1,480,000				

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/18/2003		12/18/2003		12/18/2003					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	148,000	1,480,000		

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34			Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/17/2003			12/17/2003						
Depth (Feet Below Ground Surface)				0.5			2.5						
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	148,000	1,480,000		

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND		ND		ND		ND		148,000	1,480,000		

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		Result	Flag	Result	Flag	Result	Flag	
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND	U	ND	U	586		148,000	1,480,000	

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003		12/22/2003			
				Depth (Feet Below Ground Surface)		0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	765		ND	U	--		148,000	1,480,000		

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		2/24/2004		2/24/2004		2/24/2004				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND	U	1050		--		148,000	1,480,000			

Please refer to notes at end of table.

Table C-28

Ecological Health Sediment - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)ph	µg/kg	EPA 8270M	ND	U	ND	U	--		148,000	1,480,000			

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-29

Ecological Health Sediment - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	165		527		69.9	U	129	J	75.5	U	10,800		148,000	1,480,000		

Please refer to notes at end of table.

Table C-29

Ecological Health Sediment - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	5,370		974		710	J	5,320		2,110		15	U	148,000	1,480,000		

Please refer to notes at end of table.

Table C-29

Ecological Health Sediment - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	26.7	J	17.1	U	148,000	1,480,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-30

Ecological Health Sediment - Composite Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	31,200		1,370		670
								148,000
								1,480,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010			
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0			
					Result	Flag	Result	Flag	Result	Flag	Result	Flag	
Organotins	Dibutyltin	µg/kg	PSEP	--	--	--	--	--	--	--	--	--	
	Monobutyltin	µg/kg	PSEP	--	--	--	--	--	--	--	--	--	
	Tetra-n-butyltin	µg/kg	PSEP	--	--	--	--	--	--	--	--	--	
	Tributyltin	µg/kg	PSEP	0.94	U	1.0	U	1.1	UJ	1.1	U	1.2	U
										23		23	

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03-FS	100710-3-3.7-Surface-11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration
Sample Date				9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010		
Depth (Feet Below Ground Surface)				5 - 10	0 - 5	10 - 15	0	0 - 5	0		
				Result	Flag	Result	Flag	Result	Flag		
Organotins	Dibutyltin	µg/kg	PSEP	--		--		--		--	--
	Monobutyltin	µg/kg	PSEP	--		--		--		--	--
	Tetra-n-butyltin	µg/kg	PSEP	--		--		--		--	--
	Tributyltin	µg/kg	PSEP	1.1	U	2.9		0.9	U	0.91	U

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5							
				Result	Flag	Result	Flag	Result	Flag							
Organotins	Dibutyltin	µg/kg	PSEP	--		--		--		--	--					
	Monobutyltin	µg/kg	PSEP	--		--		--		--	--					
	Tetra-n-butyltin	µg/kg	PSEP	--		--		--		--	--					
	Tributyltin	µg/kg	PSEP	0.98	U	30		0.99	U	0.91	U	0.97	UJ	0.95	U	2.3

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/19/2003	12/19/2003	12/19/2003		12/19/2003	12/19/2003					
				Depth (Feet Below Ground Surface)		0.5	2.5	2.5 DUP		0.5	1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Dibutyltin	µg/kg	PSEP	3.88		ND	U	ND	U	ND	U	ND	U	--	--	
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	--	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND	U	ND	U	--	--	
	Tributyltin	µg/kg	PSEP	8.44		ND	U	ND	U	ND	U	ND	U	2.3	23	

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
Depth (Feet Below Ground Surface)				0.5		2		0.5		2			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.44		ND	U	--	--
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.62		ND	U	--	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND		ND	U	--	--
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	10.5		ND	U	2.3	23

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level	Preliminary Hot Spot Concentration
Sample Date				12/17/2003	12/17/2003	12/16/2003			
Depth (Feet Below Ground Surface)				0.5	2.5	2			
				Result	Flag	Result	Flag	Result	Flag
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	ND	U	4.75	--
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	9.5	--
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	--
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	6.05	23

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				2/24/2004		2/24/2004		2/24/2004		2/24/2004					
Depth (Feet Below Ground Surface)				0.5		2		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	16.6		10.5		ND	U	15.2		--	--		
	Monobutyltin	µg/kg	PSEP	13.4		13.4		ND	U	9.83		--	--		
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	ND		--	--		
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	15.7		2.3	23		

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	15.1		--		--	--		
	Monobutyltin	µg/kg	PSEP	45.1		13.4		--		--	--		
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--		--	--		
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	--		2.3	23		

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003	12/22/2003	12/22/2003	Depth (Feet Below Ground Surface)		0.5	2.5	5	
				Result	Flag	Result	Flag	Result	Flag					
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	11.8	--	--	--	--	--	--	--	
	Monobutyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--	--	--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--	--	--	
	Tributyltin	µg/kg	PSEP	ND	U	ND	U	--	--	2.3	23			

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	ND	U	14.3		--		--	--		
	Monobutyltin	µg/kg	PSEP	ND	U	14.2		--		--	--		
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	--	--		
	Tributyltin	µg/kg	PSEP	ND	U	15.9		--		2.3	23		

Please refer to notes at end of table.

Table C-31

Ecological Health Sediment - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Dibutyltin	µg/kg	PSEP	21		26.1		--		--		--	
	Monobutyltin	µg/kg	PSEP	23.4		10.4		--		--		--	
	Tetra-n-butyltin	µg/kg	PSEP	ND	U	ND	U	--		--		--	
	Tributyltin	µg/kg	PSEP	26.1		ND	U	--		2.3		23	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-32

Ecological Health Sediment - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	1.0	U	1.1	U	1.1	U	1.1	U	1.2	U	2.3	23		

Please refer to notes at end of table.

Table C-32

Ecological Health Sediment - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	0.89	U	1.0	U	0.94	U	1.0	U	0.97	U	2.3	23		

Please refer to notes at end of table.

Table C-32

Ecological Health Sediment - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date		Result			
						Result	Flag		
Organotins	Tributyltin	µg/kg	PSEP	1.1	U	0.98	U	2.3	23

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-33

Ecological Health Sediment - Composite Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	10/15/2010	10/15/2010					
				Result	Flag	Result					
Organotins	Tributyltin	µg/kg	PSEP	34		1.0	U	0.98	U	2.3	23

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-34

Ecological Health Sediment - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Composite-12-WS		101510-3-3.7-Composite-07-FS		100610-3-3.8-Composite WS		101510-3-3.8-Composite-11-FS		100710-3-3.9-Composite-11-WS		101510-3-3.9-Composite-14-FS		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/7/2010		10/15/2010		10/6/2010		10/15/2010		10/7/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	120		4,600	J	79		1,200		100		1,500		3,900	39,000		
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	42		890		26		290		35		650		3,900	39,000		
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	5.7		140		2.7	J	34		4.3	J	73		3,900	39,000		
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	1.8	J	49		0.9	J	9.8		0.93	J	13		15	150		
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	17		280		6.9		57		11		210		15	150		
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	5.9		170		4.2	J	51		4.7	J	77		15	150		
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	8.2		180		3.5	J	39		5.4		110		15	150		
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	4.7	J	95		1.7	J	20		3.0	J	36		15	150		
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	0.7	J	21		0.52	U	2.6		0.36	J	9.3		15	150		
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	1.1	J	24		0.73	J	7.7		0.22	U	13		1.5	15		
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	6.1		170		2.7	J	29		4.3	J	96		14	140		
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	6.5		180		3.0	J	34		4.0	J	110		15	150		
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	12		440		5.5		68		8.6		210		1.1	11		
	2,3,7,8-TCDD	ng/kg	EPA 8290	0.51	J	6.3		0.35	J	2.9		0.069	U	4.6		0.052	0.52		
	2,3,7,8-TCDF	ng/kg	EPA 8290	11		330		5.1		89		15		200		4.3	43		
	OCDD	ng/kg	EPA 8290	1200		28,000	J	970		10,000	J	1,200		14,000	J	130,000	1,300,000		
	OCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total HpCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total HpCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total HxCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total HxCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total PeCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total PeCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		
	Total TCDD TEQ	ng/kg	EPA 8290	--		--		--		--		--		--		54	--		
	Total TCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--		

Please refer to notes at end of table.

Table C-34

Ecological Health Sediment - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	2468-001-SA P4B0481	2468-001-SA P4B0481	2468-001-SA P4B0481	Screening Level	Preliminary Hot Spot Concentration
				HA43A-2.0	HA42A-2.0	GP314AA-1.5		
				Sample Date	Result	Flag	Result	Flag
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	5970		2,310		1680
	1,2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	1890		673		489
	1,2,3,4,7,8,9-HxCDF	ng/kg	EPA 8290	216.0		109		65.5
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	80.9		90		15.9
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	729		512		181.0
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	315.0		222		82.0
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	391.0		180		91.2
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	160.0		109		35.9
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	149.0		78		40.30
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	65.5		68		13.00
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	349.0		148		78.2
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	564.0		110		130.0
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	807		139		171.0
	2,3,7,8-TCDD	ng/kg	EPA 8290	17.10		5.2		4.44
	2,3,7,8-TCDF	ng/kg	EPA 8290	730		108		198.0
	OCDD	ng/kg	EPA 8290	56,500		12,400		16,400
	OCDF	ng/kg	EPA 8290	2,690		562		806
	Total HpCDD	ng/kg	EPA 8290	--		--		--
	Total HpCDF	ng/kg	EPA 8290	--		--		--
	Total HxCDD	ng/kg	EPA 8290	--		--		--
	Total HxCDF	ng/kg	EPA 8290	--		--		--
	Total PeCDD	ng/kg	EPA 8290	--		--		--
	Total PeCDF	ng/kg	EPA 8290	--		--		--
	Total TCDD TEQ	ng/kg	EPA 8290	--		--		54
	Total TCDF	ng/kg	EPA 8290	--		--		--

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010			
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.413		0.317		0.0133	J	0.0616	J	0.0449	J
	Arsenic	mg/kg	EPA 6020	143		14.1		12.7		11.8		12.7	
	Barium	mg/kg	EPA 6020	246		273		391		218		216	
	Chromium	mg/kg	EPA 6020	407		82.3		31.6		29.6		26.6	
	Copper	mg/kg	EPA 6020	568		123		37.3		34.2		32.1	
	Lead	mg/kg	EPA 6020	898		224		895		27.8		27.4	
	Manganese	mg/kg	EPA 6020	915		670		543		819		969	
	Nickel	mg/kg	EPA 6020	228		51		24.4		26		26	
	Selenium	mg/kg	EPA 6020	0.398	J	0.266	J	0.488	J	0.0627	J	0.0131	U
	Silver	mg/kg	EPA 6020	2.83		0.357		4.09		0.220		0.262	J
	Zinc	mg/kg	EPA 6020	2,700		320		488		115		98.9	
	Antimony	mg/kg	EPA 602	--		--		--		--		--	
	Cadmium	mg/kg	EPA 602	--		--		--		--		--	

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100610-3-3.6-25-06 DUP	100710-3-3.7-Surface -11FS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/6/2010	10/7/2010		
				Depth (Feet Below Ground Surface)		5 - 10	10 - 15	0 - 5	10 - 15	20 - 25	0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.175	J	0.176		0.102		0.0262	J	0.0770	J
	Arsenic	mg/kg	EPA 6020	9.40		4.37		8.42		2.37	J	2.41	J
	Barium	mg/kg	EPA 6020	202	J	149		218		68.6		113	
	Chromium	mg/kg	EPA 6020	220	J	446		38.2		16.5		18.9	
	Copper	mg/kg	EPA 6020	109	J	53.1		100		16.3		18.4	
	Lead	mg/kg	EPA 6020	772		267		416		3.92		4.87	J
	Manganese	mg/kg	EPA 6020	2,110		2,850		527		267		248	
	Nickel	mg/kg	EPA 6020	92		263		38.1		19.5		22.1	
	Selenium	mg/kg	EPA 6020	5.76		2.29		0.239	J	0.0109	U	0.0117	U
	Silver	mg/kg	EPA 6020	0.766		0.630		0.311	J	0.0544	J	0.0587	J
	Zinc	mg/kg	EPA 6020	473		212		513		52.6		58.6	
	Antimony	mg/kg	EPA 602	--		--		--		--		--	
	Cadmium	mg/kg	EPA 602	--		--		--		--		--	

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Inorganics	Mercury	mg/kg	EPA 7471A	1.92	J	1.82		0.963		1.27		3.24		0.0502	J	93	930
	Arsenic	mg/kg	EPA 6020	7.95		21.3		18.5		19.3		18.5		6.61		8.8	170
	Barium	mg/kg	EPA 6020	118		343		292		188		328		206		60,000	600,000
	Chromium	mg/kg	EPA 6020	69.1		132		193		185		281		61.5		460,000	4,600,000
	Copper	mg/kg	EPA 6020	500		13,300		536		724		1,740		120		12,000	120,000
	Lead	mg/kg	EPA 6020	331		1,860		2,430		617		988		187		800	8,000
	Manganese	mg/kg	EPA 6020	518		1,150		1,450		1,640		2,970		1320		7,200	72,000
	Nickel	mg/kg	EPA 6020	98.2		235		287		192		248		39.6		6,100	61,000
	Selenium	mg/kg	EPA 6020	0.133	J	1.78	J	0.611	J	0.126		1.23		0.107	J	--	--
	Silver	mg/kg	EPA 6020	0.374	J	3.22		0.750	J	0.680		4.89		0.240	J	1,500	15,000
	Zinc	mg/kg	EPA 6020	463		4,800		1,890		1,440		1,810		617		--	--
	Antimony	mg/kg	EPA 602	--		--		--		--		--		--		--	--
	Cadmium	mg/kg	EPA 602	--		--		--		--		--		--		100	15,000

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-5-	100710-3-3.10-	Screening Level	Preliminary Hot Spot Concentration		
				01-FS	10-02-FS				
				Sample Date	10/7/2010	10/7/2010			
Depth (Feet Below Ground Surface)		0 - 5		5 - 10					
		Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.115	J	0.393	93	930	
	Arsenic	mg/kg	EPA 6020	3.34		2.87	8.8	170	
	Barium	mg/kg	EPA 6020	95.5		97.0	60,000	600,000	
	Chromium	mg/kg	EPA 6020	19.3		18.8	460,000	4,600,000	
	Copper	mg/kg	EPA 6020	31.9		20.3	12,000	120,000	
	Lead	mg/kg	EPA 6020	26.8		8.93	800	8,000	
	Manganese	mg/kg	EPA 6020	340		289	7,200	72,000	
	Nickel	mg/kg	EPA 6020	17.4		19.6	6,100	61,000	
	Selenium	mg/kg	EPA 6020	0.296	J	0.0113	U	--	
	Silver	mg/kg	EPA 6020	0.196	J	0.141	J	1,500	
	Zinc	mg/kg	EPA 6020	80.7		59.8	--	--	
	Antimony	mg/kg	EPA 602	--		--	--	--	
	Cadmium	mg/kg	EPA 602	--		--	100	15,000	

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5		1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.189		0.089		ND	U	0.3080		0.2650				93	930
	Arsenic	mg/kg	EPA 6020	28.8		7.37		3.7		43.2		43.3				8.8	170
	Barium	mg/kg	EPA 6020	364		115		57		260		201				60,000	600,000
	Chromium	mg/kg	EPA 6020	47.6		ND		31.7		119.0		80.5				460,000	4,600,000
	Copper	mg/kg	EPA 6020	264		102		37.3		768.0		637.0				12,000	120,000
	Lead	mg/kg	EPA 6020	561		114		100		673.0		398.0				800	8,000
	Manganese	mg/kg	EPA 6020	1430		833		698		1440		1330				7,200	72,000
	Nickel	mg/kg	EPA 6020	74.1		111		150.0		244.0		126.0				6,100	61,000
	Selenium	mg/kg	EPA 6020	0.505		ND	U	ND		0.6360		0.5060				--	--
	Silver	mg/kg	EPA 6020	ND		ND	U	ND		0.518		0.529				1,500	15,000
	Zinc	mg/kg	EPA 6020	1010		234		175		1380		1190.0				--	--
	Antimony	mg/kg	EPA 602	9.87		1.46		0.931		21.9		10.1				--	--
	Cadmium	mg/kg	EPA 602	0.458		ND	U	ND		1.17		0.895				100	15,000

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
Depth (Feet Below Ground Surface)				0.5	2	0.5	2	Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.694		1		0.2600		0.1220		93	930
	Arsenic	mg/kg	EPA 6020	6.35		8.22		8.4		3.6		8.8	170
	Barium	mg/kg	EPA 6020	160		196		157		97		60,000	600,000
	Chromium	mg/kg	EPA 6020	89.8		67.4		49.2		21.2		460,000	4,600,000
	Copper	mg/kg	EPA 6020	174		275		87.0		42.3		12,000	120,000
	Lead	mg/kg	EPA 6020	406		437		816		109.0		800	8,000
	Manganese	mg/kg	EPA 6020	1000		873		1020		297		7,200	72,000
	Nickel	mg/kg	EPA 6020	93.2		99.1		44.0		28.9		6,100	61,000
	Selenium	mg/kg	EPA 6020	ND	U	0.502		0.448		ND	U	--	--
	Silver	mg/kg	EPA 6020	ND	U	0.522		ND		ND	U	1,500	15,000
	Zinc	mg/kg	EPA 6020	1560		1000		530		152		--	--
	Antimony	mg/kg	EPA 602	4.92		7.82		3.53		0.494		--	--
	Cadmium	mg/kg	EPA 602	ND	U	1.29		ND	U	ND	U	100	15,000

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	12/17/2003	Result	Flag		
Depth (Feet Below Ground Surface)				0.5	2.5	2			
				Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.307		0.427		3.42	
	Arsenic	mg/kg	EPA 6020	4.68		2.35		9.28	
	Barium	mg/kg	EPA 6020	188		181		188	
	Chromium	mg/kg	EPA 6020	35.3		21.1		57.7	
	Copper	mg/kg	EPA 6020	126		25.9		3340	
	Lead	mg/kg	EPA 6020	242		13.7		2950	
	Manganese	mg/kg	EPA 6020	310		303		645	
	Nickel	mg/kg	EPA 6020	43.6		24.1		1020	
	Selenium	mg/kg	EPA 6020	0.893		ND	U	0.579	--
	Silver	mg/kg	EPA 6020	ND		ND	U	0.451	1,500
	Zinc	mg/kg	EPA 6020	564		83.6		2450	--
	Antimony	mg/kg	EPA 602	2.24		ND	U	167	--
	Cadmium	mg/kg	EPA 602	0.857		ND	U	7.03	100

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Screening Level	Preliminary Hot Spot Concentration				
				Sample Date	2/24/2004	2/24/2004	2/24/2004						
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5						
				Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.483		4.57		0.99		10.6		93	930
	Arsenic	mg/kg	EPA 6020	19.4		40.7		24.4		27		8.8	170
	Barium	mg/kg	EPA 6020	165		637		243		613		60,000	600,000
	Chromium	mg/kg	EPA 6020	142		464		194		259		460,000	4,600,000
	Copper	mg/kg	EPA 6020	333		1990		1370		1760		12,000	120,000
	Lead	mg/kg	EPA 6020	591		2650		1030		2950		800	8,000
	Manganese	mg/kg	EPA 6020	629		1860		2220		2330		7,200	72,000
	Nickel	mg/kg	EPA 6020	174		627		341		309		6,100	61,000
	Selenium	mg/kg	EPA 6020	0.878		0.831		ND		1.05		--	--
	Silver	mg/kg	EPA 6020	ND		2.09		0.781		1.93		1,500	15,000
	Zinc	mg/kg	EPA 6020	1290		9000		4220		5020		--	--
	Antimony	mg/kg	EPA 602	7.44		47		18		55.1		--	--
	Cadmium	mg/kg	EPA 602	6.29	U	26.7		9.3		18.7		100	15,000

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003	12/22/2003		
Depth (Feet Below Ground Surface)				0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.466		0.161		ND	
	Arsenic	mg/kg	EPA 6020	3.51		1.72		5.74	
	Barium	mg/kg	EPA 6020	140		104		135	
	Chromium	mg/kg	EPA 6020	30.9		16.4		18.7	
	Copper	mg/kg	EPA 6020	54.8		60		33.7	
	Lead	mg/kg	EPA 6020	114		78.3		55.1	
	Manganese	mg/kg	EPA 6020	427		390		567	
	Nickel	mg/kg	EPA 6020	31.3		14.1		21.2	
	Selenium	mg/kg	EPA 6020	0.529		ND	U	0.485	
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	
	Zinc	mg/kg	EPA 6020	179		127		102	
	Antimony	mg/kg	EPA 602	0.872		2.26		1.83	
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5	5	Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.24		ND		0.0686		93	930	
	Arsenic	mg/kg	EPA 6020	5.29		2.44		2.48		8.8	170	
	Barium	mg/kg	EPA 6020	165		107		53.3		60,000	600,000	
	Chromium	mg/kg	EPA 6020	154		14.6		141		460,000	4,600,000	
	Copper	mg/kg	EPA 6020	66.2		46.6		74.2		12,000	120,000	
	Lead	mg/kg	EPA 6020	206		127		21.1		800	8,000	
	Manganese	mg/kg	EPA 6020	1520		398		1440		7,200	72,000	
	Nickel	mg/kg	EPA 6020	252		32.4		159		6,100	61,000	
	Selenium	mg/kg	EPA 6020	1.15		ND	U	0.658		--	--	
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	1,500	15,000	
	Zinc	mg/kg	EPA 6020	190		90		65.1		--	--	
	Antimony	mg/kg	EPA 602	2.15		ND	U	ND	U	--	--	
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	100	15,000	

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	ND	U	2.08		0.208		93	930
	Arsenic	mg/kg	EPA 6020	15.3		20.2		4.17		8.8	170
	Barium	mg/kg	EPA 6020	192		210		67.3		60,000	600,000
	Chromium	mg/kg	EPA 6020	24.5		158		153		460,000	4,600,000
	Copper	mg/kg	EPA 6020	32.7		612		89		12,000	120,000
	Lead	mg/kg	EPA 6020	105		689		76.8		800	8,000
	Manganese	mg/kg	EPA 6020	1,070		1,710		2,720		7,200	72,000
	Nickel	mg/kg	EPA 6020	20.1		188		385		6,100	61,000
	Selenium	mg/kg	EPA 6020	ND	U	1.79		1.3		--	--
	Silver	mg/kg	EPA 6020	ND	U	2.22		ND	U	1,500	15,000
	Zinc	mg/kg	EPA 6020	138		2,100		130		--	--
	Antimony	mg/kg	EPA 602	ND	U	14.5		ND	U	5	--
	Cadmium	mg/kg	EPA 602	ND	U	4.69		ND	U	1	15,000

Please refer to notes at end of table.

Table C-35

Upland Human Health - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.19		ND	U	ND	U	93	930
	Arsenic	mg/kg	EPA 6020	1.04		1.16		1.87		8.8	170
	Barium	mg/kg	EPA 6020	122		86.7		93.4		60,000	600,000
	Chromium	mg/kg	EPA 6020	9.79		11.6		13.1		460,000	4,600,000
	Copper	mg/kg	EPA 6020	30.5		18.9		16.9		12,000	120,000
	Lead	mg/kg	EPA 6020	22.1		7.17		5.4		800	8,000
	Manganese	mg/kg	EPA 6020	853		292		233		7,200	72,000
	Nickel	mg/kg	EPA 6020	8.89		15.7		17.9		6,100	61,000
	Selenium	mg/kg	EPA 6020	ND	U	ND	U	ND	U	--	--
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	1,500	15,000
	Zinc	mg/kg	EPA 6020	81.8		54		52.7		--	--
	Antimony	mg/kg	EPA 602	ND	U	ND	U	ND	U	--	--
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	100	15,000

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-36

Upland Human Health - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	2.64		1.93		2.41		2.13		0.226		4.02		93	930		
	Arsenic	mg/kg	EPA 6020	11.1		48.2		32.1		25.3		9.60		61.4		8.8	170		
	Barium	mg/kg	EPA 6020	205		324		324		554		164		985		60,000	600,000		
	Chromium	mg/kg	EPA 6020	64.8		142		170		147		112		918		460,000	4,600,000		
	Copper	mg/kg	EPA 6020	268		892		872		142		88.9		2,340		12,000	120,000		
	Lead	mg/kg	EPA 6020	518		1,550		3,200		3,700		611		2,990		800	8,000		
	Manganese	mg/kg	EPA 6020	811		1,810		1,840		1,250		4,310		3,290		7,200	72,000		
	Nickel	mg/kg	EPA 6020	63.8	J	164		117		75.3		70.5		1590		6,100	61,000		
	Selenium	mg/kg	EPA 6020	0.205	J	0.732	J	0.978	J	0.207	J	0.199	J	0.971		--	--		
	Silver	mg/kg	EPA 6020	0.381	J	1.260	J	0.555	J	0.518	J	0.227	J	2.26		1,500	15,000		
	Zinc	mg/kg	EPA 6020	1,000		7,540		3,740		1,940		479		8,820		--	--		

Please refer to notes at end of table.

Table C-36

Upland Human Health - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	18.9		2.73		2.89		1.94		3.20		0.0907	J	93	930		
	Arsenic	mg/kg	EPA 6020	68.9		55.9		26.7		24.2		24.4		2.93		8.8	170		
	Barium	mg/kg	EPA 6020	788		214		561		449		328		111		60,000	600,000		
	Chromium	mg/kg	EPA 6020	569		353		284		222		249		23.5		460,000	4,600,000		
	Copper	mg/kg	EPA 6020	1,740		2,270		1,710		1,230		1,170		24.3		12,000	120,000		
	Lead	mg/kg	EPA 6020	4,160		2,550		2,160		1,390		1,500		11.3		800	8,000		
	Manganese	mg/kg	EPA 6020	2,820		3,170		1,610		2,220		2,230		346		7,200	72,000		
	Nickel	mg/kg	EPA 6020	1,040		356		388		241		251		23.3		6,100	61,000		
	Selenium	mg/kg	EPA 6020	0.642		28.1		0.563		0.398		0.0938		0.0564	J	--	--		
	Silver	mg/kg	EPA 6020	2.36		1.96		1.72		1.45		0.844		0.169	J	1,500	15,000		
	Zinc	mg/kg	EPA 6020	7,110		7,960		9,470		4,640		3,380		83.8		--	--		

Please refer to notes at end of table.

Table C-36

Upland Human Health - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.279		0.361		93	930
	Arsenic	mg/kg	EPA 6020	5.74		4.55		8.8	170
	Barium	mg/kg	EPA 6020	154		140		60,000	600,000
	Chromium	mg/kg	EPA 6020	30.6		27.8		460,000	4,600,000
	Copper	mg/kg	EPA 6020	43.9		34.3		12,000	120,000
	Lead	mg/kg	EPA 6020	114		22.7		800	8,000
	Manganese	mg/kg	EPA 6020	540		487		7,200	72,000
	Nickel	mg/kg	EPA 6020	29.3		26.5		6,100	61,000
	Selenium	mg/kg	EPA 6020	0.0119	U	0.0316	J	--	--
	Silver	mg/kg	EPA 6020	0.327	J	0.379	J	1,500	15,000
	Zinc	mg/kg	EPA 6020	200		112		--	--

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-37

Upland Human Health - Composite Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	10/15/2010	10/15/2010		
Inorganics	Mercury	mg/kg	EPA 7471A	8.38	3.36	3.21	93	930
	Arsenic	mg/kg	EPA 6020	37.9	25.7	28.5	8.8	170
	Barium	mg/kg	EPA 6020	758	462	415	60,000	600,000
	Chromium	mg/kg	EPA 6020	282	252	358	460,000	4,600,000
	Copper	mg/kg	EPA 6020	2,010	893	941	12,000	120,000
	Lead	mg/kg	EPA 6020	2,610	1,980	2,660	800	8,000
	Manganese	mg/kg	EPA 6020	2,060	1,650	2,240	7,200	72,000
	Nickel	mg/kg	EPA 6020	507	255	342	6,100	61,000
	Selenium	mg/kg	EPA 6020	1.32	J	0.436	J	--
	Silver	mg/kg	EPA 6020	2.52	J	1.28	J	15,000
	Zinc	mg/kg	EPA 6020	7,670	4,270	4,380	--	--

1. -- = Not Applicable/ Not Analyzed/ Not available

2. mg/kg = milligrams per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010								
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
	Aroclor 1254	µg/kg	EPA 8082	97.1	U	39.5	J	30.0	J	4.14	J	2.24	U	2,360	U	--	--
	Aroclor 1260	µg/kg	EPA 8082	1,020		4.02	U	4.16	U	2.15	U	2.24	U	197	U	--	--
	Total PCBs	µg/kg	EPA 8082	1,857		59.1	J	30.0	J	4.14	J	4.5	U	2,360		560	56,000

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface-11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration						
Sample Date				9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010								
Depth (Feet Below Ground Surface)				5 - 10	0 - 5	10 - 15	0	0 - 5	0								
				Result	Flag	Result	Flag	Result	Flag								
	Aroclor 1254	µg/kg	EPA 8082	200		121	J	1.81	U	16,100		1,160		10,000		--	--
	Aroclor 1260	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	--	--
	Total PCBs	µg/kg	EPA 8082	200		215	J	3.6	U	16,100		1,932		10,000		560	56,000

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS		100710-3-3.9-Surface-10-FS		100710-3-3.9-5-01-FS		100710-3-3.10-Surface-11-WS		100710-3-3.10-01-FS		100710-3-3.10-10-02-FS		Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		10/6/2010		10/7/2010		10/7/2010		10/7/2010		10/7/2010							
				Depth (Feet Below Ground Surface)		0 - 5		0		0 - 5		0		0 - 5		5 - 10					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag						
	Aroclor 1254	µg/kg	EPA 8082	373	U	14,600	J	4,840		84.6		49.1		1.93	U	--	--				
	Aroclor 1260	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	2.07	J	--	--				
	Total PCBs	µg/kg	EPA 8082	5,710		14,600	J	5,758		84.6		59.7		2.07	J	560	56,000				

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/19/2003	12/19/2003	12/19/2003		12/19/2003	12/19/2003		
Depth (Feet Below Ground Surface)				0.5	2.5	2.5 DUP		0.5	1.5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
	Aroclor 1254	µg/kg	EPA 8082	ND	U	380		250		2350		340	--
	Aroclor 1260	µg/kg	EPA 8082	78.9		128		84.6		614		218	--
	Total PCBs	µg/kg	EPA 8082	78.9		508		334.6		2964		558	560
													56,000

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/18/2003		12/18/2003		12/18/2003							
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
	Aroclor 1254	µg/kg	EPA 8082	462		1230		ND	U	ND	U	--	--				
	Aroclor 1260	µg/kg	EPA 8082	214		411		463		92		--	--				
	Total PCBs	µg/kg	EPA 8082	676		1641		463.00		92.10		560	56,000				

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34		Primary Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/17/2003	12/17/2003		12/16/2003		
				Depth (Feet Below Ground Surface)		0.5	2.5		2		
				Result	Flag	Result	Flag	Result	Flag		
	Aroclor 1254	µg/kg	EPA 8082	332		ND	U	3570		--	
	Aroclor 1260	µg/kg	EPA 8082	330		ND	U	ND	U	--	
	Total PCBs	µg/kg	EPA 8082	662		ND	U	3570		560	
										56,000	

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
	Aroclor 1254	µg/kg	EPA 8082	281		7080		5170		24900		--	--		
	Aroclor 1260	µg/kg	EPA 8082	153		3110		ND	U	6060		--	--		
	Total PCBs	µg/kg	EPA 8082	434		10,190		5170		30960		560	56,000		

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result		Flag		Result		Flag			
	Aroclor 1254	µg/kg	EPA 8082	122		ND	U	ND	U	--	--		
	Aroclor 1260	µg/kg	EPA 8082	90.7		ND	U	ND	U	--	--		
	Total PCBs	µg/kg	EPA 8082	212.7		ND	U	ND	U	560	56,000		

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result		Flag		Result		Flag			
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--		
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--		
	Total PCBs	µg/kg	EPA 8082	ND	U	ND	U	ND	U	560	56,000		

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		2/24/2004		2/24/2004				
				Depth (Feet Below Ground Surface)	Result	Flag	Result	Flag	Result	Flag		
	Aroclor 1254	µg/kg	EPA 8082	4920			6090		ND	U	--	--
	Aroclor 1260	µg/kg	EPA 8082	1150			1300		ND	U	--	--
	Total PCBs	µg/kg	EPA 8082	6070			7390		ND	U	560	56,000

Please refer to notes at end of table.

Table C-38

Upland Human Health - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--		
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--		
	Total PCBs	µg/kg	EPA 8082	ND	U	ND	U	ND	U	560	56,000		

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-39

Upland Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	660	J	3,790		135	J	1,070		52.2	J	11,200		--	--		
	Aroclor 1260	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	--	--		
	Total PCBs	µg/kg	EPA 8082	966	J	4,950	J	325	J	1,584	J	98.4	J	14,160	J	560	56,000		

Please refer to notes at end of table.

Table C-39

Upland Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	24,700	J	3,920		11,400		12,000		24,500		4.96	--	--	--		
	Aroclor 1260	µg/kg	EPA 8082	2,030	U	368	U	996	U	947	U	2,090	U	2.67	J	--	--		
	Total PCBs	µg/kg	EPA 8082	31,180	J	4,940	J	15,760	J	14,310	J	28,340	J	7.63	J	560	56,000		

Please refer to notes at end of table.

Table C-39

Upland Human Health - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/15/2010		10/15/2010				
				Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	14.6		2.15	U	--	--		
	Aroclor 1260	µg/kg	EPA 8082	14.5		9.8		--	--		
	Total PCBs	µg/kg	EPA 8082	29.1		9.8		560	56,000		

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-40

Upland Human Health - Composite Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
PCBs	Aroclor 1254	µg/kg	EPA 8082	14,700		4,780	J	17,700
	Aroclor 1260	µg/kg	EPA 8082	1,030	U	394	U	973
	Total PCBs	µg/kg	EPA 8082	14,700		4,780	J	17,700
								560
								56,000

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
			Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010								
			Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0								
			Result	Flag	Result	Flag	Result	Flag	Result	Flag							
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	761		47.3	J	264		6.51	J	4.45	U	48.7	J	--	--
	Acenaphthene	µg/kg	EPA 8270M	249		19.7	U	800		15.1	J	4.45	U	26.5	J	19,000,000	190,000,000
	Acenaphthylene	µg/kg	EPA 8270M	535		19.7	U	1,470		5.47	J	4.45	U	35.0	J	--	--
	Anthracene	µg/kg	EPA 8270M	694		19.7	U	4,150		44.6		4.45	U	73.6	J	93,000,000	930,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	2,460		62.0	J	8,960		83.4		9.32	J	345		2,700	270,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,700		97.1		8,740		90.5		10.9	J	430		270	27,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2,250		124		6,270		61.6		11.7	J	472		2,700	270,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1,710		94.1		6,760		51.5		8.68	J	468		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	1,950		69.6	J	5,830		68.5		11.7	J	412		27,000	2,700,000
	Chrysene	µg/kg	EPA 8270M	2,840		102		9,990		97.1		17.9	J	475		250,000	25,000,000
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	489		21.2	J	1,480		16.2	J	4.45	U	113		270	27,000
	Fluoranthene	µg/kg	EPA 8270M	5,710		107		18,600		242		33.4		546		8,900,000	89,000,000
	Fluorene	µg/kg	EPA 8270M	457		19.7	U	1,270		19.6		4.54	J	28.5	J	12,000,000	120,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1,400		65.9	J	5,100		47.8		7.77	J	372		2,700	270,000
	Naphthalene	µg/kg	EPA 8270M	1,020		52.7	J	308		20.5		4.45	U	65.6	J	23,000	2,300,000
	Phenanthrene	µg/kg	EPA 8270M	2,380		80.1	J	18,100		150		42.4		298		--	--
	Pyrene	µg/kg	EPA 8270M	5,040		126		24,200		268		37.7		577		6,700,000	67,000,000
	LPAHs	µg/kg	--	6,100		260		26,360		260		70		580		--	--
	HPAHs	µg/kg	--	26,550		870		95,930		1,030		150		4,210		--	--
	Total PAHs	µg/kg	--	32,650		1,130		122,290		1,290		220		4,790		--	--
	BaP Eq	µg/kg	--	3,840		150		12,390		130		20		670		270	270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS		090810-3-3.4-10-02-FS		100510-3-3.5-05-01-FS		100610-3-3.6-15-03 FS		100710-3-3.7-Surface -11FS		100710-3-3.7-5-01-FS		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		9/8/2010		9/8/2010		10/5/2010		10/6/2010		10/7/2010						
				Depth (Feet Below Ground Surface)		5 - 10		10 - 15		0 - 5		10 - 15		0		0 - 5				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	386		54.3		27.8	J	3.52	U	77.6	J	20.2	J	--	--			
	Acenaphthene	µg/kg	EPA 8270M	49.7	U	20.6	J	27.4	J	3.52	U	56.8	J	17.9	U	19,000,000	190,000,000			
	Acenaphthylene	µg/kg	EPA 8270M	108	J	63.3		28.4	J	3.65	J	98.6	J	25.7	J	--	--			
	Anthracene	µg/kg	EPA 8270M	153	J	61.9		54.1		3.52	U	406		38.4	J	93,000,000	930,000,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	1,280		382		339		4.41	J	1,270		144		2,700	270,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,090		646		316		7.02	J	986		214		270	27,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2,590		765		742		4.26	J	1,020		204		2,700	270,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,960		811		388		6.16	J	1,010		230		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	2,010		672		391		4.96	J	831		152		27,000	2,700,000			
	Chrysene	µg/kg	EPA 8270M	2,050		778		925		5.81	J	1,430		207		250,000	25,000,000			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	718		203		97.8		3.52	U	225		57.4	J	270	27,000			
	Fluoranthene	µg/kg	EPA 8270M	1,220		799		488		10.0	J	3,100		218		8,900,000	89,000,000			
	Fluorene	µg/kg	EPA 8270M	121	J	21.0	J	23.0	J	3.52	U	75.4	J	17.9	U	12,000,000	120,000,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,070		640		303		4.41	J	749		176		2,700	270,000			
	Naphthalene	µg/kg	EPA 8270M	266		86.2		42.1		17.3		106	J	38.3	J	23,000	2,300,000			
	Phenanthrene	µg/kg	EPA 8270M	585		380		193		9.16	J	1,520		154		--	--			
	Pyrene	µg/kg	EPA 8270M	1,780		943		586		13.6	J	2,840		256		6,700,000	67,000,000			
	LPAHs	µg/kg	--	1,670		690		390		50		2,340		310		--	--			
	HPAHs	µg/kg	--	18,770		6,640		4,580		60		13,460		1,860		--	--			
	Total PAHs	µg/kg	--	20,440		7,330		4,970		110		15,800		2,170		--	--			
	BaP Eq	µg/kg	--	3,450		1,040		560		12		1,530		330		270	270,000			

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
			Sample Date	10/6/2010	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
			Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0	0 - 5								
			Result	Flag	Result	Flag	Result	Flag	Result	Flag							
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	82.9	J	60.3	J	20.6		44.4		28.7	J	5.30	J	--	--
	Acenaphthene	µg/kg	EPA 8270M	15.7	J	85.5		13.7		78.3		12.8	J	3.87	UJ	19,000,000	190,000,000
	Acenaphthylene	µg/kg	EPA 8270M	71.7	J	53.3	J	31.1		40.8		29.6		10.3	J	--	--
	Anthracene	µg/kg	EPA 8270M	105	J	142		53.3		273		43.7		12.1	J	93,000,000	930,000,000
	Benz(a)anthracene	µg/kg	EPA 8270M	281	J	653		155		634		182		35.3	J	2,700	270,000
	Benz(a)pyrene	µg/kg	EPA 8270M	366	J	681		199		657		300		45.3	J	270	27,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	409	J	723		185		637		299		37.1	J	2,700	270,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	430	J	644		210		570		361		45.6	J	--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	296	J	576		138		562		205		30.4	J	27,000	2,700,000
	Chrysene	µg/kg	EPA 8270M	443	J	877		212		753		261		46.8	J	250,000	25,000,000
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	94.1	J	173		43.8		151		65.6		8.69	J	270	27,000
	Fluoranthene	µg/kg	EPA 8270M	562	J	1,630		283		1450		313		65.2	J	8,900,000	89,000,000
	Fluorene	µg/kg	EPA 8270M	21.9	J	77.4		15.5		74.6		15.1	J	3.87	UJ	12,000,000	120,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	322	J	524		164		473		270		33.6	J	2,700	270,000
	Naphthalene	µg/kg	EPA 8270M	142	J	104		27.8		76.5		43.4		19.2	J	23,000	2,300,000
	Phenanthrene	µg/kg	EPA 8270M	453	J	1,160		161		961		157		39.8	J	--	--
	Pyrene	µg/kg	EPA 8270M	711	J	1,310		314		1,260		430		80.6	J	6,700,000	67,000,000
	LPAHs	µg/kg	--	900		1,680		330		1,550		330		90		--	--
	HPAHs	µg/kg	--	3,910		7,790		1,900		7,150		2,690		430		--	--
	Total PAHs	µg/kg	--	4,810		9,470		2,230		8,700		3,020		520		--	--
	BaP Eq	µg/kg	--	570		1,060		300		990		450		70		270	270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control EvaluationSchnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	36.4	U	--
	Acenaphthene	µg/kg	EPA 8270M	31.8		19,000,000
	Acenaphthylene	µg/kg	EPA 8270M	19.4		--
	Anthracene	µg/kg	EPA 8270M	24.5		93,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	17.8		2,700
	Benzo(a)pyrene	µg/kg	EPA 8270M	24.6		270
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	19.8		2,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.4		--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	15.8		27,000
	Chrysene	µg/kg	EPA 8270M	23.6		250,000
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	3.78		270
	Fluoranthene	µg/kg	EPA 8270M	83.9		8,900,000
	Fluorene	µg/kg	EPA 8270M	22.8		12,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.6	J	2,700
	Naphthalene	µg/kg	EPA 8270M	120		23,000
	Phenanthrene	µg/kg	EPA 8270M	104		--
	Pyrene	µg/kg	EPA 8270M	102		6,700,000
	LPAHs	µg/kg	--	360		--
	HPAHs	µg/kg	--	330		--
	Total PAHs	µg/kg	--	690		--
	BaP Eq	µg/kg	--	30		270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003							
				Depth (Feet Below Ground Surface)		0.5		2.5		2.5 DUP		0.5		1.5							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	--	--						
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	19,000,000	190,000,000						
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	--	--						
	Anthracene	µg/kg	EPA 8270M	17.4		ND	U	ND	U	ND	U	ND	U	93,000,000	930,000,000						
	Benzo(a)anthracene	µg/kg	EPA 8270M	47.9		22.6		32.8		244		205		2,700	270,000						
	Benzo(a)pyrene	µg/kg	EPA 8270M	38.4		10.1		20.2		126		106		270	27,000						
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	62.8		10.1		24.4		169		ND	U	2,700	270,000						
	Benzo(ghi)perylene	µg/kg	EPA 8270M	34		10		18.5		219		139		--	--						
	Benzo(k)fluranthene	µg/kg	EPA 8270M	13.9		10		10.1		ND	U	ND	U	27,000	2,700,000						
	Chrysene	µg/kg	EPA 8270M	41.8		10		11.8		ND	U	ND	U	250,000	25,000,000						
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	11.3		ND	U	ND	U	ND	U	ND	U	270	27,000						
	Fluoranthene	µg/kg	EPA 8270M	69.7		10.9		30.3		253		106		8,900,000	89,000,000						
	Fluorene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	12,000,000	120,000,000						
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	30.5		10		15.1		118		ND	U	2,700	270,000						
	Naphthalene	µg/kg	EPA 8270M	11.3		15.1		12.6		ND	U	ND	U	23,000	2,300,000						
	Phenanthrene	µg/kg	EPA 8270M	43.6		10.9		27.8		228		ND	U	--	--						
	Pyrene	µg/kg	EPA 8270M	68		16.8		51.3		337		115		6,700,000	67,000,000						
	LPAHs	µg/kg	--	70		30		40		220		0		--	--						
	HPAHs	µg/kg	--	420		110		210		1470		670		--	--						
	Total PAHs	µg/kg	--	490		140		250		1690		670		--	--						
	BaP Eq	µg/kg	--	60		10		30		180		130		270	270,000						

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/18/2003	12/18/2003	12/18/2003		12/18/2003	12/18/2003					
				Depth (Feet Below Ground Surface)		0.5	2	0.5		2						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	19,000,000	190,000,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	--	--			
	Anthracene	µg/kg	EPA 8270M	135		261		ND	U	ND	U	93,000,000	930,000,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	499		1040		404		142		2,700	270,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	467		988		311		109		270	27,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	602		877		404		150		2,700	270,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	348		664		278		112		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	261		340		160		101		27,000	2,700,000			
	Chrysene	µg/kg	EPA 8270M	578		1640		219		86.1		250,000	25,000,000			
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	270	27,000			
	Fluoranthene	µg/kg	EPA 8270M	720		1190		539		112		8,900,000	89,000,000			
	Fluorene	µg/kg	EPA 8270M	ND		111		ND	U	ND	U	12,000,000	120,000,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	301		450		219		52.4		2,700	270,000			
	Naphthalene	µg/kg	EPA 8270M	ND	U	253		ND	U	ND	U	23,000	2,300,000			
	Phenanthrene	µg/kg	EPA 8270M	459		1220		185		711		--	--			
	Pyrene	µg/kg	EPA 8270M	689		2040		463		195		6,700,000	67,000,000			
	LPAHs	µg/kg	--	590		1840		180		710		--	--			
	HPAHs	µg/kg	--	4470		9230		3000		1060		--	--			
	Total PAHs	µg/kg	--	5060		11070		3180		1770		--	--			
	BaP Eq	µg/kg	--	610		1240		420		150		270	270,000			

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/17/2003	12/17/2003		12/16/2003		
Depth (Feet Below Ground Surface)				0.5	2.5	2					
				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--
	Acenaphthene	µg/kg	EPA 8270M	ND	U	32.1		ND	U	19,000,000	190,000,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	36.5		ND	U	--	--
	Anthracene	µg/kg	EPA 8270M	ND	U	343		ND	U	93,000,000	930,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	86.1		532		270		2,700	270,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	115		903		314		270	27,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	118		512		326		2,700	270,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	117		1130		196		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	83.1		462		239	U	27,000	2,700,000
	Chrysene	µg/kg	EPA 8270M	109		684		344	U	250,000	25,000,000
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	19.5		ND	U	270	27,000
	Fluoranthene	µg/kg	EPA 8270M	156		2480		400		8,900,000	89,000,000
	Fluorene	µg/kg	EPA 8270M	ND	U	23		ND	U	12,000,000	120,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	86.9		703		164		2,700	270,000
	Naphthalene	µg/kg	EPA 8270M	ND	U	48.2		ND	U	23,000	2,300,000
	Phenanthrene	µg/kg	EPA 8270M	79.3		2230		183		--	--
	Pyrene	µg/kg	EPA 8270M	191		3350		607		6,700,000	67,000,000
	LPAHs	µg/kg	--	80		2710		180		--	--
	HPAHs	µg/kg	--	1060		10780		2,860		--	--
	Total PAHs	µg/kg	--	1140		13490		3,040		--	--
	BaP Eq	µg/kg	--	150		1110		390		270	270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004		2/24/2004			
				Depth (Feet Below Ground Surface)		0.5	2	0.5	2.5	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	10,300		--	--
	Acenaphthene	µg/kg	EPA 8270M	ND	U	41.3		ND	U	26900		19,000,000	190,000,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	191		ND	U	647		--	--
	Anthracene	µg/kg	EPA 8270M	ND		178		143		23300		93,000,000	930,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	81.9		579		492		20800		2,700	270,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	110		712		478		12400		270	27,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	109		572		410		10900		2,700	270,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	132		816		331		1660		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	105		617		413		12900		27,000	2,700,000
	Chrysene	µg/kg	EPA 8270M	111		719		571		24500		250,000	25,000,000
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	150		90		844		270	27,000
	Fluoranthene	µg/kg	EPA 8270M	150		1250		872		50500		8,900,000	89,000,000
	Fluorene	µg/kg	EPA 8270M	ND	U	125		ND	U	20300		12,000,000	120,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	91		571		268		1870		2,700	270,000
	Naphthalene	µg/kg	EPA 8270M	ND	U	357		ND	U	10900		23,000	2,300,000
	Phenanthrene	µg/kg	EPA 8270M	88.5		1250		577		75900		--	--
	Pyrene	µg/kg	EPA 8270M	166		1690		1190		53500		6,700,000	67,000,000
	LPAHs	µg/kg	--	80		2140		720		168250		--	--
	HPAHs	µg/kg	--	1060		7680		5120		189870		--	--
	Total PAHs	µg/kg	--	1140		9820		5840		358120		--	--
	BaP Eq	µg/kg	--	140		1050		690		16770		270	270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

SuSchnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2			
				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--	--
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	19,000,000	190,000,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--
	Anthracene	µg/kg	EPA 8270M	ND	U	22.7		ND	U	93,000,000	930,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	50.4		70.6		27.1		2,700	270,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	30.7		46.3		23.8		270	27,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	48.8		57.6		19.7		2,700	270,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.6		27.6		16.4		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		33.3		21.3		27,000	2,700,000
	Chrysene	µg/kg	EPA 8270M	19.7		27.6		19.7		250,000	25,000,000
	Dibeno(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND		270	27,000
	Fluoranthene	µg/kg	EPA 8270M	30		77.9		13.9		8,900,000	89,000,000
	Fluorene	µg/kg	EPA 8270M	ND	U	10.6		ND	U	12,000,000	120,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.9		23.5		ND	U	2,700	270,000
	Naphthalene	µg/kg	EPA 8270M	19.7	U	ND		ND	U	23,000	2,300,000
	Phenanthrene	µg/kg	EPA 8270M	27.5		68.2		ND	U	--	--
	Pyrene	µg/kg	EPA 8270M	76.3		124		41.8		6,700,000	67,000,000
	LPAHs	µg/kg	--	50		100		0		--	--
	HPAHs	µg/kg	--	290		490		180		--	--
	Total PAHs	µg/kg	--	340		590		180		--	--
	BaP Eq	µg/kg	--	40		60		30		270	270,000

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5	2	0.5						
				Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		--	--			
	Acenaphthene	µg/kg	EPA 8270M	50.6		ND	U	ND	U	19,000,000	190,000,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--			
	Anthracene	µg/kg	EPA 8270M	64.7		ND	U	132		93,000,000	930,000,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	1340		73.2		2890		2,700	270,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2380		97.7		4030		270	27,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2280		119		4070		2,700	270,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1180		101		3120		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3230		61.8		3590		27,000	2,700,000			
	Chrysene	µg/kg	EPA 8270M	2730		95.2		3990		250,000	25,000,000			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	486		27.7		1320		270	27,000			
	Fluoranthene	µg/kg	EPA 8270M	1240		61.8		2910		8,900,000	89,000,000			
	Fluorene	µg/kg	EPA 8270M	35.7		ND		ND	U	12,000,000	120,000,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1280		85.4		2920		2,700	270,000			
	Naphthalene	µg/kg	EPA 8270M	93.7		22		ND	U	23,000	2,300,000			
	Phenanthrene	µg/kg	EPA 8270M	477		35		762		--	--			
	Pyrene	µg/kg	EPA 8270M	1310		84.6		3170		6,700,000	67,000,000			
	LPAHs	µg/kg	--	720		50		890		--	--			
	HPAHs	µg/kg	--	17460		810		32010		--	--			
	Total PAHs	µg/kg	--	18180		860		32900		--	--			
	BaP Eq	µg/kg	--	3400		150		6410		270	270,000			

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	U	--
	Acenaphthene	µg/kg	EPA 8270M	ND	U	52.3		40.3			19,000,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	1270		ND			--
	Anthracene	µg/kg	EPA 8270M	ND	U	744		45.6			93,000,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	242		3010		334			2,700
	Benzo(a)pyrene	µg/kg	EPA 8270M	ND		3270		446			270
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	10.8		2830		605			2,700
	Benzo(ghi)perylene	µg/kg	EPA 8270M	ND		2840		212			--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		3660		313			27,000
	Chrysene	µg/kg	EPA 8270M	ND		3470		539			250,000
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	381		71.5			270
	Fluoranthene	µg/kg	EPA 8270M	10.8		6790		321			8,900,000
	Fluorene	µg/kg	EPA 8270M	ND	U	208		27.4			12,000,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	ND		2020		218			2,700
	Naphthalene	µg/kg	EPA 8270M	ND	U	204		49.5			23,000
	Phenanthrene	µg/kg	EPA 8270M	ND		4380		189			--
	Pyrene	µg/kg	EPA 8270M	20.9		10800		495			6,700,000
	LPAHs	µg/kg	--	0		6860		360			--
	HPAHs	µg/kg	--	280		39070		3550			--
	Total PAHs	µg/kg	--	280		45930		3910			--
	BaP Eq	µg/kg	--	--		4510		640			270

Please refer to notes at end of table.

Table C-41

Upland Human Health - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5	5	Result	Flag	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--	--	
	Acenaphthene	µg/kg	EPA 8270M	ND	U	322		ND	U	19,000,000	190,000,000	
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	102		ND	U	--	--	
	Anthracene	µg/kg	EPA 8270M	44.1		429		11.6		93,000,000	930,000,000	
	Benzo(a)anthracene	µg/kg	EPA 8270M	84.2		543		26.2		2,700	270,000	
	Benzo(a)pyrene	µg/kg	EPA 8270M	40.9		338		11.6		270	27,000	
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	75.4		338		11.6		2,700	270,000	
	Benzo(ghi)perylene	µg/kg	EPA 8270M	46.5		169		ND	U	--	--	
	Benzo(k)fluranthene	µg/kg	EPA 8270M	78.6		177		ND	U	27,000	2,700,000	
	Chrysene	µg/kg	EPA 8270M	120		1400		ND	U	250,000	25,000,000	
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	270	27,000	
	Fluoranthene	µg/kg	EPA 8270M	64.2		544		41.7		8,900,000	89,000,000	
	Fluorene	µg/kg	EPA 8270M	ND	U	940		10		12,000,000	120,000,000	
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	26.5		66.8		ND	U	2,700	270,000	
	Naphthalene	µg/kg	EPA 8270M	ND	U	ND	U	56.3		23,000	2,300,000	
	Phenanthrene	µg/kg	EPA 8270M	43.3		1190		50.9		--	--	
	Pyrene	µg/kg	EPA 8270M	93.1		2170		61		6,700,000	67,000,000	
	LPAHs	µg/kg	--	90		2980		130		--	--	
	HPAHs	µg/kg	--	630		5750		150		--	--	
	Total PAHs	µg/kg	--	720		8730		280		--	--	
	BaP Eq	µg/kg	--	60		440		--		270	270,000	

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-42

Upland Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	112		80.3		76.0		39.3		22.0	J	91.8		--	--		
	Acenaphthene	µg/kg	EPA 8270M	130		101		7.50	J	13.4	J	9.8	J	51.4		19,000,000	190,000,000		
	Acenaphthylene	µg/kg	EPA 8270M	63.1	J	86.6		23.9	J	43.9		14.8	J	37.2		--	--		
	Anthracene	µg/kg	EPA 8270M	214		286		43.4		30.1		23.4	J	115		93,000,000	930,000,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	428		1,370		106		127		139		318		2,700	270,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	501		967		149		206	J	244		426		270	27,000		
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	477		1,570		134		257		240		469		2,700	270,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	483		861		357		327		289		581		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	372		969		105		180		177		372		27,000	2,700,000		
	Chrysene	µg/kg	EPA 8270M	550		2,180		179		318		217		428		250,000	25,000,000		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	109		280		47.5		56.0		72.2		131		270	27,000		
	Fluoranthene	µg/kg	EPA 8270M	877		1,870		216		637		234		637		8,900,000	89,000,000		
	Fluorene	µg/kg	EPA 8270M	113		103		11.2	J	32.8		12.7	J	43.5		12,000,000	120,000,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	361		700		152		216		228		409		2,700	270,000		
	Naphthalene	µg/kg	EPA 8270M	125		150		55.9		124		26.2	J	117		23,000	2,300,000		
	Phenanthrene	µg/kg	EPA 8270M	1,070		1,110		212		697		191		394		--	--		
	Pyrene	µg/kg	EPA 8270M	924		1,670		259		758		288		618		6,700,000	67,000,000		
	LPAHs	µg/kg	--	1,830		1,910		430		980		300		850		--	--		
	HPAHs	µg/kg	--	5,080		12,440		1,700		3,080		2,130		4,390		--	--		
	Total PAHs	µg/kg	--	6,910		14,350		2,130		4,060		2,430		5,240		--	--		
	BaP Eq	µg/kg	--	750		1,630		240		330		380		690		270	27,000		

Please refer to notes at end of table.

Table C-42

Upland Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	192		44.3		94.1		56.6		31.6	J	12.1	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	291		23.4	J	116		20.4	J	17.2	J	5.36	J	19,000,000	190,000,000		
	Acenaphthylene	µg/kg	EPA 8270M	166		26.6	J	104		183		34.7		8.73	J	--	--		
	Anthracene	µg/kg	EPA 8270M	2,000		65.3		604		165		60.1		9.12	J	93,000,000	930,000,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	5,870		231		1,800		559		210		16.3		2,700	270,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	3,970		284		1,680		705		278		18.7		270	27,000		
	Be nzo(b)fluoranthene	µg/kg	EPA 8270M	4,060		316		1,710		597		260		42.5		2,700	270,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,730		295		1,210		748		315		21.3		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3,450		219		1,370		467		236		18.8		27,000	2,700,000		
	Chrysene	µg/kg	EPA 8270M	6,390		316		1,990		685		283		36.6		250,000	25,000,000		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	874		71.3		300		135		66.8		4.39	J	270	27,000		
	Fluoranthene	µg/kg	EPA 8270M	10,300		393		3,910		1,150		368		41.0		8,900,000	89,000,000		
	Fluorene	µg/kg	EPA 8270M	366		21.4	J	123		34.0		15.8	J	8.12	J	12,000,000	120,000,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,430		221		1,010		540		238		15.7		2,700	270,000		
	Naphthalene	µg/kg	EPA 8270M	401		56.5		169		111		54.1		33.8		23,000	2,300,000		
	Phenanthrene	µg/kg	EPA 8270M	7,490		198		2,080		720		188		35.5		--	--		
	Pyrene	µg/kg	EPA 8270M	11,200		402		3,790		1,340		390		41.0		6,700,000	67,000,000		
	LPAHs	µg/kg	--	10,910		430		3,290		1,290		410		110		--	--		
	HPAHs	µg/kg	--	51,270		2,750		18,770		6,930		2,640		260		--	--		
	Total PAHs	µg/kg	--	62,180		3,180		22,060		8,220		3,050		370		--	--		
	BaP Eq	µg/kg	--	6,150		440		2,460		1,020		420		30		270	27,000		

Please refer to notes at end of table.

Table C-42

Upland Human Health - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	9.36	J	4.94	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	3.92	U	4.23	U	19,000,000	190,000,000		
	Acenaphthylene	µg/kg	EPA 8270M	9.18	J	10.3	J	--	--		
	Anthracene	µg/kg	EPA 8270M	9.18	J	6.47	J	93,000,000	930,000,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	25.6		20.1		2,700	270,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	32.1		28.5		270	27,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	40.2		24.5		2,700	270,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	29.1		27.9		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	31.2		20.8		27,000	2,700,000		
	Chrysene	µg/kg	EPA 8270M	44.7		27.6		250,000	25,000,000		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	6.82	J	5.53	J	270	27,000		
	Fluoranthene	µg/kg	EPA 8270M	66.2		34.0		8,900,000	89,000,000		
	Fluorene	µg/kg	EPA 8270M	5.82	J	4.23	U	12,000,000	120,000,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	23.6		21.4		2,700	270,000		
	Naphthalene	µg/kg	EPA 8270M	27.2		16.1	J	23,000	2,300,000		
	Phenanthrene	µg/kg	EPA 8270M	55.1		24.5		--	--		
	Pyrene	µg/kg	EPA 8270M	57.6		48.1		6,700,000	67,000,000		
	LPAHs	µg/kg	--	120		70		--	--		
	HPAHs	µg/kg	--	360		260		--	--		
	Total PAHs	µg/kg	--	480		330		--	--		
	BaP Eq	µg/kg	--	50		40		270	27,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-43

Upland Human Health - Composite Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS		101510-3-3.8-Composite-11-FS		101510-3-3.9-Composite-14-FS		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	63.9		42.8		77.1		--	--		
	Acenaphthene	µg/kg	EPA 8270M	26.2	J	22.0	J	56.6		19,000,000	190,000,000		
	Acenaphthylene	µg/kg	EPA 8270M	31.1	J	31.3		44.1		--	--		
	Anthracene	µg/kg	EPA 8270M	78.9		74.4		128		93,000,000	930,000,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	202		225		394		2,700	270,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	280		280		447		270	27,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	308		289		417		2,700	270,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	342		361		474		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	267		217		344		27,000	2,700,000		
	Chrysene	µg/kg	EPA 8270M	277		317		526		250,000	25,000,000		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	75.3		76.5		112		270	27,000		
	Fluoranthene	µg/kg	EPA 8270M	463		404		724		8,900,000	89,000,000		
	Fluorene	µg/kg	EPA 8270M	27.2	J	23.0	J	48.4		12,000,000	120,000,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	246		257		370		2,700	270,000		
	Naphthalene	µg/kg	EPA 8270M	86.6		69.9		118		23,000	2,300,000		
	Phenanthrene	µg/kg	EPA 8270M	265		270		511		--	--		
	Pyrene	µg/kg	EPA 8270M	394		433		738		6,700,000	67,000,000		
	LPAHs	µg/kg	--	580		530		980		--	--		
	HPAHs	µg/kg	--	2,850		2,860		4,550		--	--		
	Total PAHs	µg/kg	--	3,430		3,390		5,530		--	--		
	BaP Eq	µg/kg	--	440		440		690		270	27,000		

Notes:

1. -- = Not Applicable/Not Analyzed

2. µg/kg = micrograms per kilogram

3. J = the result is an estimated quantity

4. U= undetected at the method detection limit shown

5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity

6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7- Surface - 11FS	100710-3-3.7- 5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9- Surface-10-FS	100710-3-3.9- 5-01-FS	Primary Screening Level						
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0							
				Result	Flag	Result	Flag	Result	Flag							
SVOCs	Dibenzofuran	µg/kg	EPA 8082	301	U	152	U	320	U	312	U	148	U	314	U	--

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	
				Sample Date		12/19/2003		12/19/2003		12/19/2003			
				Depth (Feet Below Ground Surface)	Result	Flag	Result	Flag	Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	ND	--

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
				Depth (Feet Below Ground Surface)		0.5		2		0.5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	--	

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level
				Sample Date	12/17/2003	12/17/2003	12/16/2003	
				Depth (Feet Below Ground Surface)	0.5	2.5	2	
				Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	
				Sample Date		2/24/2004		2/24/2004		2/24/2004			
				Depth (Feet Below Ground Surface)		0.5		2		0.5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	13,200		--	

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	
				Sample Date		12/22/2003		12/22/2003			
				Depth (Feet Below Ground Surface)		0.5		2.5			
				Result	Flag	Result	Flag	Result	Flag		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	--	

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	--	--	

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level		
				Sample Date		2/24/2004		2/24/2004		2/24/2004		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--		--		

Please refer to notes at end of table.

Table C-44

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003		
				Depth (Feet Below Ground Surface)		0.5		2.5		5		
				Result	Flag	Result	Flag	Result	Flag			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--		--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010								
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	766		80.2	U	2,070	U	17.0	U	18.1	U	1,170		150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	0								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	807	U	29.8	U	683		14.3	U	10,000		187	J	150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	10,000		187	J	27,100		773		252		4,610		150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/7/2010	10/7/2010		
				Depth (Feet Below Ground Surface)	0	0 - 5		
		Result		Flag	Result	Flag	Result	Flag
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	578		72.2	J	15.3
							U	150,000
								15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/19/2003		12/19/2003		12/19/2003		12/19/2003					
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	682		ND	U	150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39		HA-40		Primary Screening Level	Preliminary Hot Spot Concentration			
				100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS	100410-3-3.2-5-01-FS					
Sample Date		12/18/2003		12/18/2003		12/18/2003		12/18/2003				
Depth (Feet Below Ground Surface)		0.5		2		0.5		2				
		Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	150,000	15,000,000	

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41		HA-34		Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/17/2003	12/17/2003	12/16/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	2					
				Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	150,000	15,000,000	

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	2/24/2004	Depth (Feet Below Ground Surface)	0.5				
						Result	Flag	Result	Flag	Result	Flag
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND		ND		ND		ND	
										150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	586		150,000	15,000,000			

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	765		ND	U	--		150,000	15,000,000

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	1050		--		150,000	15,000,000		

Please refer to notes at end of table.

Table C-45

Upland Human Health - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	--		150,000	15,000,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-46

Upland Human Health - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	165		527		69.9	U	129	J	75.5	U	10,800		150,000	15,000,000		

Please refer to notes at end of table.

Table C-46

Upland Human Health - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	5,370		974		710	J	5320		2,110		15.0	U	150,000	15,000,000		

Please refer to notes at end of table.

Table C-46

Upland Human Health - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/15/2010	10/15/2010					
					Result	Flag	Result				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	26.7	J	17.1	U	150,000	15,000,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-47

Upland Human Health - Composite Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	31,200		1,370		670
								150,000
								15,000,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010							
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Organotins	Tributyltin	µg/kg	PSEP	0.94	U	1.0	U	1.1	UJ	1.1	U	1.2	U	23	--	--

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03-FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration	
				Sample Date	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010			
				Depth (Feet Below Ground Surface)	5 - 10	0 - 5	10 - 15	0	0 - 5			
					Result	Flag	Result	Flag	Result	Flag		
Organotins	Tributyltin	µg/kg	PSEP		1.1	U	2.9		0.9	U	0.91	U
									0.90	U	9.9	
										--	--	--

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag								
Organotins	Tributyltin	µg/kg	PSEP	0.98	U	30		0.99	U	0.91	U	0.97	UJ	0.95	U	--	--

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration			
Sample Date				12/19/2003	12/19/2003		12/19/2003		12/19/2003		12/19/2003					
Depth (Feet Below Ground Surface)				0.5	2.5		2.5 DUP		0.5		1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Tributyltin	µg/kg	PSEP	8.44		ND	U	ND	U	ND	U	ND	U	--	--	

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results
 Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
				Depth (Feet Below Ground Surface)		0.5		2		0.5		2	
Organotins	Tributyltin	µg/kg	PSEP	Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	10.5		ND	U	2.3	23

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34			Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/17/2003	12/17/2003		12/16/2003		
				Depth (Feet Below Ground Surface)		0.5	2.5		2		
				Result	Flag	Result	Flag	Result	Flag		
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	6.05		--	--

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	15.7		--	--		

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
Organotins	Tributyltin	µg/kg	PSEP	Result	Flag	Result	Flag	Result	Flag	--	--	--	--	
Organotins	Tributyltin	µg/kg	PSEP	ND		ND		--		--		--		

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	--	--	--	--		

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results
 Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation
 Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		2/24/2004		2/24/2004		2/24/2004				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
Organotins	Tributyltin	µg/kg	PSEP	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Tributyltin	µg/kg	PSEP	ND	U	15.9		--		--	--			

Please refer to notes at end of table.

Table C-48

Upland Human Health - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/22/2003	12/22/2003	12/22/2003					
Depth (Feet Below Ground Surface)				0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag		
Organotins	Tributyltin	µg/kg	PSEP	26.1		ND	U	--	--	--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-49

Upland Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	1.0	U	1.1	U	1.1	U	1.1	U	1.2	U	--	--		

Please refer to notes at end of table.

Table C-49

Upland Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	0.89	U	1.0	U	0.94	U	1.0	U	0.97	U	--	--		

Please refer to notes at end of table.

Table C-49

Upland Human Health - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date	10/15/2010	10/15/2010					
				Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.1	U	0.98	U	--	--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-50

Upland Human Health - Composite Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	10/15/2010		
				Result	Flag	Result		
Organotins	Tributyltin	µg/kg	PSEP	34	1.0	U	0.98	U
					--		--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-51

Upland Human Health - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-	101510-3-3.7-	100610-3-3.8-	101510-3-3.8-	100710-3-3.9-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration	
				Composite-12-WS	Composite-07-FS	Composite WS	Composite-11-FS	Composite-11-WS	Composite-14-FS			
				Sample Date	10/7/2010	10/15/2010	10/6/2010	10/15/2010	10/7/2010			
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	120		4,600	J	79	1,200		100	1,500
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	42		890		26	290		35	650
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	5.7		140		2.7	J	34	4.3	J 73
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	1.8	J	49		0.9	J	9.8	0.93	J 13
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	17		280		6.9	57		11	210
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	5.9		170		4.2	J	51	4.7	J 77
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	8.2		180		3.5	J	39	5.4	110
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	4.7	J	95		1.7	J	20	3.0	J 36
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	0.7	J	21		0.52	U	2.6	0.36	J 9.3
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	1.1	J	24		0.73	J	7.7	0.22	U 13
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	6.1		170		2.7	J	29	4.3	J 96
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	6.5		180		3.0	J	34	4.0	J 110
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	12		440		5.5	68		8.6	210
	2,3,7,8-TCDD	ng/kg	EPA 8290	0.51	J	6		0.35	J	2.9	0.069	U 4.6
	2,3,7,8-TCDF	ng/kg	EPA 8290	11		330		5.1	89		15	200
	OCDD	ng/kg	EPA 8290	1,200		28,000	J	970		10,000	J	1200
	OCDF	ng/kg	EPA 8290	--		--		--		--	--	--
	Total HpCDD	ng/kg	EPA 8290	--		--		--		--	--	--
	Total HpCDF	ng/kg	EPA 8290	--		--		--		--	--	--
	Total HxCDD	ng/kg	EPA 8290	--		--		--		--	--	--
	Total HxCDF	ng/kg	EPA 8290	--		--		--		--	--	--
	Total PeCDD	ng/kg	EPA 8290	--		--		--		--	--	--
	Total PeCDF	ng/kg	EPA 8290	--		--		--		--	--	--
	Total TCDD	ng/kg	EPA 8290	12		83		3.4	23		1.6	47
	Total TCDF	ng/kg	EPA 8290	--		--		--		--	15	--
Please refer to notes at end of table.												

Table C-51

Upland Human Health - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	2468-001-SA P4B0481	2468-001-SA P4B0481	2468-001-SA P4B0481	Screening Level	Preliminary Hot Spot Concentration	
				HA43A-2.0	HA42A-2.0	GP314AA-1.5			
				Sample Date		Result	Flag	Result	
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	5970		2,310		1680	--
	1,2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	1890		673		489	--
	1,2,3,4,7,8,9-HxCDF	ng/kg	EPA 8290	216		109		65.5	--
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	80.9		90		15.9	--
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	729		512		181	--
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	315		222		82	--
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	391		180		91.2	--
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	160		109		35.9	--
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	149		78		40.3	--
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	65.5		68		13	--
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	349		148		78.2	--
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	564		110		130	--
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	807		139		171	--
	2,3,7,8-TCDD	ng/kg	EPA 8290	17.1		5.2		4.44	15 1,500
	2,3,7,8-TCDF	ng/kg	EPA 8290	730		108		198	--
	OCDD	ng/kg	EPA 8290	56,500		12,400		16,400	--
	OCDF	ng/kg	EPA 8290	2,690		562		806	--
	Total HpCDD	ng/kg	EPA 8290	--		--		--	--
	Total HpCDF	ng/kg	EPA 8290	--		--		--	--
	Total HxCDD	ng/kg	EPA 8290	--		--		--	--
	Total HxCDF	ng/kg	EPA 8290	--		--		--	--
	Total PeCDD	ng/kg	EPA 8290	--		--		--	--
	Total PeCDF	ng/kg	EPA 8290	--		--		--	--
	Total TCDD	ng/kg	EPA 8290	--		--		15	--
	Total TCDF	ng/kg	EPA 8290	--		--		--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010		
				Depth (Feet Below Ground Surface)		0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.413		0.317		0.0133	J	0.0616	J	0.0449	
	Arsenic	mg/kg	EPA 6020	143		14.1		12.7		11.8		12.7	27.4
	Barium	mg/kg	EPA 6020	246		273		391		218		216	281
	Chromium	mg/kg	EPA 6020	407		82.3		31.6		29.6		26.6	183
	Copper	mg/kg	EPA 6020	568		123		37.3		34.2		32.1	587
	Lead	mg/kg	EPA 6020	898		224		895		27.8		27.4	738
	Manganese	mg/kg	EPA 6020	915		670		543		819		969	1,650
	Nickel	mg/kg	EPA 6020	228		51.0		24.4		26.0		26.0	176
	Selenium	mg/kg	EPA 6020	0.398	J	0.266		J	0.488	J	0.0627	J	0.0131
	Silver	mg/kg	EPA 6020	2.83		0.357	J	4.09		0.220	J	0.262	J
	Zinc	mg/kg	EPA 6020	2,700		320		488		115		98.9	1,520
	Antimony	mg/kg	EPA 602	--		--		--		--		--	--
	Cadmium	mg/kg	EPA 602	--		--		--		--		--	--

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100610-3-3.6-25-06 DUP	100710-3-3.7-Surface -11FS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/6/2010							
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	20 - 25							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag					
Inorganics	Mercury	mg/kg	EPA 7471A	0.175	J	0.176		0.0262	J	0.0770	J	5.71	0.23	1		
	Arsenic	mg/kg	EPA 6020	9.40		4.37		2.37	J	2.41	J	29.1	10	100		
	Barium	mg/kg	EPA 6020	202	J	149		218		68.6	113	458	790	850		
	Chromium	mg/kg	EPA 6020	220	J	446		38.2		16.5	18.9	279	76	1,300		
	Copper	mg/kg	EPA 6020	109	J	53.1		100		16.3	18.4	1,840	50	500		
	Lead	mg/kg	EPA 6020	772		267		416		3.92	4.87	J	1,780	79	500	
	Manganese	mg/kg	EPA 6020	2,110		2,850		527		267	248	1,940	1,800	5,000		
	Nickel	mg/kg	EPA 6020	92		263		38.1		19.5	22.1	447	47	300		
	Selenium	mg/kg	EPA 6020	5.76		2.29		0.239	J	0.0109	U	0.697	J	1	10	
	Silver	mg/kg	EPA 6020	0.766		0.630		0.311	J	0.0544	J	0.0587	J	5.45	2	20
	Zinc	mg/kg	EPA 6020	473		212		513		52.6	58.6	5,510	180	500		
	Antimony	mg/kg	EPA 602	--		--		--		--	--	--	5	50		
	Cadmium	mg/kg	EPA 602	--		--		--		--	--	--	4	40		

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface -11-WS	Screening Level	Preliminary Hot Spot Concentration						
Sample Date				10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010	10/7/2010								
Depth (Feet Below Ground Surface)				0 - 5	0	0 - 5	0	0 - 5	0								
				Result	Flag	Result	Flag	Result	Flag								
Inorganics	Mercury	mg/kg	EPA 7471A	1.92	J	1.82		0.963		1.27		3.24		0.0502	J	0.23	1
	Arsenic	mg/kg	EPA 6020	7.95		21.3		18.5		19.3		18.5		6.61		10	100
	Barium	mg/kg	EPA 6020	118		343		292		188		328		206		790	850
	Chromium	mg/kg	EPA 6020	69.1		132		193		185		281		61.5		76	1,300
	Copper	mg/kg	EPA 6020	500		13,300		536		724		1,740		120		50	500
	Lead	mg/kg	EPA 6020	331		1,860		2,430		617		988		187		79	500
	Manganese	mg/kg	EPA 6020	518		1,150		1,450		1,640		2,970		1,320		1,800	5,000
	Nickel	mg/kg	EPA 6020	98.2		235		287		192		248		39.6		47	300
	Selenium	mg/kg	EPA 6020	0.133	J	1.78	J	0.611	J	0.126		1.23		0.107	J	1	10
	Silver	mg/kg	EPA 6020	0.374	J	3.22		0.750	J	0.680		4.89		0.240	J	2	20
	Zinc	mg/kg	EPA 6020	463		4,800		1,890		1,440		1,810		617		180	500
	Antimony	mg/kg	EPA 602	--		--		--		--		--		--		5	50
	Cadmium	mg/kg	EPA 602	--		--		--		--		--		--		4	40

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
Sample Date				10/7/2010	10/7/2010		
Depth (Feet Below Ground Surface)				0 - 5	5 - 10		
				Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.115	J	0.393	
	Arsenic	mg/kg	EPA 6020	3.34		2.87	10
	Barium	mg/kg	EPA 6020	95.5		97.0	850
	Chromium	mg/kg	EPA 6020	19.3		18.8	76
	Copper	mg/kg	EPA 6020	31.9		20.3	50
	Lead	mg/kg	EPA 6020	26.8		8.93	79
	Manganese	mg/kg	EPA 6020	340		289	1,300
	Nickel	mg/kg	EPA 6020	17.4		19.6	500
	Selenium	mg/kg	EPA 6020	0.296	J	0.0113	5,000
	Silver	mg/kg	EPA 6020	0.196	J	0.141	47
	Zinc	mg/kg	EPA 6020	80.7		59.8	300
	Antimony	mg/kg	EPA 602	--		--	1
	Cadmium	mg/kg	EPA 602	--		--	10

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003						
Depth (Feet Below Ground Surface)				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	0.5	2.5	2.5 DUP	0.5	1.5
Inorganics	Mercury	mg/kg	EPA 7471A	0.189		0.089		ND	U	0.3080		0.265		0.23		1				
	Arsenic	mg/kg	EPA 6020	28.8		7.37		3.7		43.2		43.3		10		100				
	Barium	mg/kg	EPA 6020	364		115		57		260		201		790		850				
	Chromium	mg/kg	EPA 6020	47.6		102		31.7		119.0		80.5		76		1,300				
	Copper	mg/kg	EPA 6020	264		67.8		37.3		768.0		637		50		500				
	Lead	mg/kg	EPA 6020	561		114		100		673.0		398		79		500				
	Manganese	mg/kg	EPA 6020	1430		833		698		1440		1330		1,800		5,000				
	Nickel	mg/kg	EPA 6020	74.1		111		150.0		244.0		126		47		300				
	Selenium	mg/kg	EPA 6020	0.505		ND	U	ND	U	0.6360		0.5060		1		10				
	Silver	mg/kg	EPA 6020	ND		ND	U	ND	U	0.518		0.529		2		20				
	Zinc	mg/kg	EPA 6020	1010		234		175		1380		1190		180		500				
	Antimony	mg/kg	EPA 602	9.87		1.46		0.931		21.9		10.1		5		50				
	Cadmium	mg/kg	EPA 602	0.458		ND	U	ND	U	1.17		0.895		4		40				

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003		12/18/2003		12/18/2003			
Depth (Feet Below Ground Surface)				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.694		1		0.2600		0.1220		0.23	1
	Arsenic	mg/kg	EPA 6020	6.35		8.22		8.4		3.6		10	100
	Barium	mg/kg	EPA 6020	160		196		157		97		790	850
	Chromium	mg/kg	EPA 6020	89.8		67.4		49.2		21.2		76	1,300
	Copper	mg/kg	EPA 6020	174		275		87.0		42.3		50	500
	Lead	mg/kg	EPA 6020	406		437		816		109.0		79	500
	Manganese	mg/kg	EPA 6020	1000		873		1020		297		1,800	5,000
	Nickel	mg/kg	EPA 6020	93.2		99.1		44.0		28.9		47	300
	Selenium	mg/kg	EPA 6020	ND	U	0.502		0.448		ND	U	1	10
	Silver	mg/kg	EPA 6020	ND	U	0.522		ND		ND	U	2	20
	Zinc	mg/kg	EPA 6020	1560		1000		530		152		180	500
	Antimony	mg/kg	EPA 602	4.92		7.82		3.53		0.494		5	50
	Cadmium	mg/kg	EPA 602	ND	U	1.29		ND	U	ND	U	4	40

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34			Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/17/2003		12/17/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.307		0.427		3.42		0.23	1
	Arsenic	mg/kg	EPA 6020	4.68		2.35		9.28		10	100
	Barium	mg/kg	EPA 6020	188		181		188		790	850
	Chromium	mg/kg	EPA 6020	35.3		21.1		57.7		76	1,300
	Copper	mg/kg	EPA 6020	126		25.9		3340		50	500
	Lead	mg/kg	EPA 6020	242		13.7		2950		79	500
	Manganese	mg/kg	EPA 6020	310		303		645		1,800	5,000
	Nickel	mg/kg	EPA 6020	43.6		24.1		1020		47	300
	Selenium	mg/kg	EPA 6020	0.893		ND	U	0.579		1	10
	Silver	mg/kg	EPA 6020	ND	U	ND	U	0.451		2	20
	Zinc	mg/kg	EPA 6020	564		83.6		2450		180	500
	Antimony	mg/kg	EPA 602	2.24		ND	U	167		5	50
	Cadmium	mg/kg	EPA 602	0.857		ND	U	7.03		4	40

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
Depth (Feet Below Ground Surface)				0.5	2	0.5	2.5	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Inorganics	Mercury	mg/kg	EPA 7471A	0.483		4.57		0.99		10.6		0.23	1		
	Arsenic	mg/kg	EPA 6020	19.4		40.7		24.4		27		10	100		
	Barium	mg/kg	EPA 6020	165		637		243		613		790	850		
	Chromium	mg/kg	EPA 6020	142		464		194		259		76	1,300		
	Copper	mg/kg	EPA 6020	333		1990		1370		1760		50	500		
	Lead	mg/kg	EPA 6020	591		2650		1030		2950		79	500		
	Manganese	mg/kg	EPA 6020	629		1860		2220		2330		1,800	5,000		
	Nickel	mg/kg	EPA 6020	174		627		341		309		47	300		
	Selenium	mg/kg	EPA 6020	0.878		0.831		ND		1.05		1	10		
	Silver	mg/kg	EPA 6020	ND		2.09		0.781		1.93		2	20		
	Zinc	mg/kg	EPA 6020	1290		9000		4220		5020		180	500		
	Antimony	mg/kg	EPA 602	7.44		47		18		55.1		5	50		
	Cadmium	mg/kg	EPA 602	6.29	U	26.7		9.3		18.7		4	40		

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	0.466		0.161		ND		0.23	1
	Arsenic	mg/kg	EPA 6020	3.51		1.72		5.74		10	100
	Barium	mg/kg	EPA 6020	140		104		135		790	850
	Chromium	mg/kg	EPA 6020	30.9		16.4		18.7		76	1,300
	Copper	mg/kg	EPA 6020	54.8	60			33.7		50	500
	Lead	mg/kg	EPA 6020	114		78.3		55.1		79	500
	Manganese	mg/kg	EPA 6020	427		390		567		1,800	5,000
	Nickel	mg/kg	EPA 6020	31.3		14.1		21.2		47	300
	Selenium	mg/kg	EPA 6020	0.529		ND	U	0.485		1	10
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2	20
	Zinc	mg/kg	EPA 6020	179		127		102		180	500
	Antimony	mg/kg	EPA 602	0.872		2.26		1.83		5	50
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	4	40

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
Depth (Feet Below Ground Surface)				0.5		2.5		5						
				Result	Flag	Result	Flag	Result	Flag					
Inorganics	Mercury	mg/kg	EPA 7471A	0.24		ND		0.0686		0.23	1			
	Arsenic	mg/kg	EPA 6020	5.29		2.44		2.48		10	100			
	Barium	mg/kg	EPA 6020	165		107		53.3		790	850			
	Chromium	mg/kg	EPA 6020	154		14.6		141		76	1,300			
	Copper	mg/kg	EPA 6020	66.2		46.6		74.2		50	500			
	Lead	mg/kg	EPA 6020	206		127		21.1		79	500			
	Manganese	mg/kg	EPA 6020	1520		398		1440		1,800	5,000			
	Nickel	mg/kg	EPA 6020	252		32.4		159		47	300			
	Selenium	mg/kg	EPA 6020	1.15		ND	U	0.658		1	10			
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2	20			
	Zinc	mg/kg	EPA 6020	190		90		65.1		180	500			
	Antimony	mg/kg	EPA 602	2.15		ND	U	ND	U	5	50			
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	4	40			

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag		
Inorganics	Mercury	mg/kg	EPA 7471A	ND	U	2.08		0.208		0.23	1
	Arsenic	mg/kg	EPA 6020	15.3		20.2		4.17		10	100
	Barium	mg/kg	EPA 6020	192		210		67.3		790	850
	Chromium	mg/kg	EPA 6020	24.5		158		153		76	1,300
	Copper	mg/kg	EPA 6020	32.7		612		89		50	500
	Lead	mg/kg	EPA 6020	105		689		76.8		79	500
	Manganese	mg/kg	EPA 6020	1070		1710		2720		1,800	5,000
	Nickel	mg/kg	EPA 6020	20.1		188		385		47	300
	Selenium	mg/kg	EPA 6020	ND	U	1.79		1.3		1	10
	Silver	mg/kg	EPA 6020	ND	U	2.22		ND		2	20
	Zinc	mg/kg	EPA 6020	138		2100		130		180	500
	Antimony	mg/kg	EPA 602	ND	U	14.5		ND	U	5	50
	Cadmium	mg/kg	EPA 602	ND	U	4.69		ND	U	4	40

Please refer to notes at end of table.

Table C-52

Terrestrial Ecological - Boring Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration	
				Sample Date		12/22/2003		12/22/2003				
Depth (Feet Below Ground Surface)				0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag			
Inorganics	Mercury	mg/kg	EPA 7471A	0.19		ND	U	ND	U	0.23	1	
	Arsenic	mg/kg	EPA 6020	1.04		1.16		1.87		10	100	
	Barium	mg/kg	EPA 6020	122		86.7		93.4		790	850	
	Chromium	mg/kg	EPA 6020	9.79		11.6		13.1		76	1,300	
	Copper	mg/kg	EPA 6020	30.5		18.9		16.9		50	500	
	Lead	mg/kg	EPA 6020	22.1		7.17		5.4		79	500	
	Manganese	mg/kg	EPA 6020	853		292		233		1,800	5,000	
	Nickel	mg/kg	EPA 6020	8.89		15.7		17.9		47	300	
	Selenium	mg/kg	EPA 6020	ND	U	ND	U	ND	U	1	10	
	Silver	mg/kg	EPA 6020	ND	U	ND	U	ND	U	2	20	
	Zinc	mg/kg	EPA 6020	81.8		54		52.7		180	500	
	Antimony	mg/kg	EPA 602	ND	U	ND	U	ND	U	5	50	
	Cadmium	mg/kg	EPA 602	ND	U	ND	U	ND	U	4	40	

Notes:

1. -- = Not Applicable/ Not Analyzed/ Not available
2. mg/kg = milligrams per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-53

Terrestrial Ecological - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	2.64		1.93		2.41		2.13		0.226		4.02		0.23	1		
	Arsenic	mg/kg	EPA 6020	11.1		48.2		32.1		25.3		9.60		61.4		10	100		
	Barium	mg/kg	EPA 6020	205		324		324		554		164		985		790	850		
	Chromium	mg/kg	EPA 6020	64.8		142		170		147		112		918		76	1,300		
	Copper	mg/kg	EPA 6020	268		892		872		142		88.9		2,340		50	500		
	Lead	mg/kg	EPA 6020	518		1,550		3,200		3,700		611		2,990		79	500		
	Manganese	mg/kg	EPA 6020	811		1,810		1,840		1,250		4,310		3,290		1,800	5,000		
	Nickel	mg/kg	EPA 6020	63.8	J	164		117		75.3		70.5		1,590		47	300		
	Selenium	mg/kg	EPA 6020	0.205	J	0.732	J	0.978	J	0.207	J	0.199	J	0.971		1	10		
	Silver	mg/kg	EPA 6020	0.381	J	1.260	J	0.555	J	0.518	J	0.227	J	2.26		2	20		
	Zinc	mg/kg	EPA 6020	1,000		7,540		3,740		1,940		479		8,820		180	500		

Please refer to notes at end of table.

Table C-53

Terrestrial Ecological - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	18.9		2.73		2.89		1.94		3.20		0.0907	J	0.23	1		
	Arsenic	mg/kg	EPA 6020	68.9		55.9		26.7		24.2		24.4		2.93		10	100		
	Barium	mg/kg	EPA 6020	788		214		561		449		328		111		790	850		
	Chromium	mg/kg	EPA 6020	569		353		284		222		249		23.5		76	1,300		
	Copper	mg/kg	EPA 6020	1,740		2,270		1,710		1,230		1,170		24.3		50	500		
	Lead	mg/kg	EPA 6020	4,160		2,550		2,160		1,390		1,500		11.3		79	500		
	Manganese	mg/kg	EPA 6020	2,820		3,170		1,610		2,220		2,230		346		1,800	5,000		
	Nickel	mg/kg	EPA 6020	1,040		356		388		241		251		23.3		47	300		
	Selenium	mg/kg	EPA 6020	0.642		28.1		0.563		0.398		0.0938		0.0564	J	1	10		
	Silver	mg/kg	EPA 6020	2.36		1.96		1.72		1.45		0.844		0.169	J	2	20		
	Zinc	mg/kg	EPA 6020	7,110		7,960		9,470		4,640		3,380		83.8		180	500		

Please refer to notes at end of table.

Table C-53

Terrestrial Ecological - Surface Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	0.279		0.361		0.23	1		
	Arsenic	mg/kg	EPA 6020	5.74		4.55		10	100		
	Barium	mg/kg	EPA 6020	154		140		790	850		
	Chromium	mg/kg	EPA 6020	30.6		27.8		76	1,300		
	Copper	mg/kg	EPA 6020	43.9		34.3		50	500		
	Lead	mg/kg	EPA 6020	114		22.7		79	500		
	Manganese	mg/kg	EPA 6020	540		487		1,800	5,000		
	Nickel	mg/kg	EPA 6020	29.3		26.5		47	300		
	Selenium	mg/kg	EPA 6020	0.0119	U	0.0316	J	1	10		
	Silver	mg/kg	EPA 6020	0.327	J	0.379	J	2	20		
	Zinc	mg/kg	EPA 6020	200		112		180	500		

Notes

1. -- = Not Applicable/ Not Analyzed/ Not available
2. mg/kg = milligrams per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-54

Terrestrial Ecological - Composite Sample Metals Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS		101510-3-3.8-Composite-11-FS		101510-3-3.9-Composite-14-FS		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag				
Inorganics	Mercury	mg/kg	EPA 7471A	8.38		3.36		3.21		0.23	1		
	Arsenic	mg/kg	EPA 6020	37.9		25.7		28.5		10	100		
	Barium	mg/kg	EPA 6020	758		462		415		790	850		
	Chromium	mg/kg	EPA 6020	282		252		358		76	1,300		
	Copper	mg/kg	EPA 6020	2,010		893		941		50	500		
	Lead	mg/kg	EPA 6020	2,610		1,980		2,660		79	500		
	Manganese	mg/kg	EPA 6020	2,060		1,650		2,240		1,800	5,000		
	Nickel	mg/kg	EPA 6020	507		255		342		47	300		
	Selenium	mg/kg	EPA 6020	1.32	J	0.386	J	0.436	J	1	10		
	Silver	mg/kg	EPA 6020	2.52	J	1.34	J	1.28	J	2	20		
	Zinc	mg/kg	EPA 6020	7,670		4,270		4,380		180	500		

Notes

1. -- = Not Applicable/ Not Analyzed/ Not available
2. mg/kg = milligrams per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration					
Sample Date				10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010	9/8/2010							
Depth (Feet Below Ground Surface)				0 - 5	5 - 10	10 - 15	5 - 10	10 - 15	0							
				Result	Flag	Result	Flag	Result	Flag							
	Aroclor 1254	µg/kg	EPA 8082	97.1	U	39.5	J	30.0	J	4.14	U	2,360				
	Aroclor 1260	µg/kg	EPA 8082	1,020		4.02	U	4.16	U	2.15	U	197	U	--		
	Total PCBs	µg/kg	EPA 8082	1,857		59.1	J	30.0	J	4.14	J	4.5	U	2,360	371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration						
Sample Date				9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010	10/6/2010								
Depth (Feet Below Ground Surface)				5 - 10	0 - 5	10 - 15	0	0 - 5	0								
				Result	Flag	Result	Flag	Result	Flag								
	Aroclor 1254	µg/kg	EPA 8082	200		121	J	1.81	U	16,100		1,160		10,000		700	7,000
	Aroclor 1260	µg/kg	EPA 8082	10.0	U	9.48	U	1.81	U	904	U	182	U	764	U	--	--
	Total PCBs	µg/kg	EPA 8082	200		215	J	3.6	U	16,100		1,932		10,000		371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
	Aroclor 1254	µg/kg	EPA 8082	373	U	14,600	J	4,840		84.6		49.1		1.93	U	700	7,000
	Aroclor 1260	µg/kg	EPA 8082	373	U	882	U	375	U	18.1	U	3.93	U	2.07	J	--	--
	Total PCBs	µg/kg	EPA 8082	5,710		14,600	J	5,758		84.6		59.7		2.07	J	371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/19/2003	12/19/2003		12/19/2003	12/19/2003							
				Depth (Feet Below Ground Surface)		0.5	2.5		2.5 DUP	0.5		1.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
	Aroclor 1254	µg/kg	EPA 8082	ND	U	380		250		2350		340					
	Aroclor 1260	µg/kg	EPA 8082	78.9		128		84.6		614		218	--				
	Total PCBs	µg/kg	EPA 8082	78.9		508		334.6		2964		558	371				

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39			HA-40			Primary Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/18/2003	12/18/2003		12/18/2003		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag
	Aroclor 1254	µg/kg	EPA 8082	462		1230		ND	U	ND	U
	Aroclor 1260	µg/kg	EPA 8082	214		411		463		92	--
	Total PCBs	µg/kg	EPA 8082	676		1641		463.00		92.10	371

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42		HA-43		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	2/24/2004	Depth (Feet Below Ground Surface)	0.5					
				Result	Flag	Result	Flag	Result	Flag			
	Aroclor 1254	µg/kg	EPA 8082	281		7080		5170		24900	700	7,000
	Aroclor 1260	µg/kg	EPA 8082	153		3110		ND		6060	--	--
	Total PCBs	µg/kg	EPA 8082	434		10,190		5170		30960	371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003	12/22/2003				
Depth (Feet Below Ground Surface)				0.5	2.5	5					
				Result	Flag	Result	Flag	Result	Flag		
	Aroclor 1254	µg/kg	EPA 8082	122		ND	U	ND	U	700	7,000
	Aroclor 1260	µg/kg	EPA 8082	90.7		ND	U	ND	U	--	--
	Total PCBs	µg/kg	EPA 8082	212.7		ND	U	ND	U	371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
Depth (Feet Below Ground Surface)				0.5		2.5		5						
				Result	Flag	Result	Flag	Result	Flag					
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	700	7,000			
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--			
	Total PCBs	µg/kg	EPA 8082	0		0		0		371	3,710			

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314				Screening Level	Preliminary Hot Spot Concentration
				Sample Date		2/24/2004	2/24/2004		
Depth (Feet Below Ground Surface)				0.5	2.5	5			
				Result	Flag	Result	Flag	Result	Flag
	Aroclor 1254	µg/kg	EPA 8082	4920		6090		ND	U
	Aroclor 1260	µg/kg	EPA 8082	1150		1300		ND	U
	Total PCBs	µg/kg	EPA 8082	6070		7390		ND	U
								700	7,000
								--	--
								371	3,710

Please refer to notes at end of table.

Table C-55

Terrestrial Ecological - Boring Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/22/2003		12/22/2003							
				Depth (Feet Below Ground Surface)		0.5		2.5		5					
				Result	Flag	Result	Flag	Result	Flag						
	Aroclor 1254	µg/kg	EPA 8082	ND	U	ND	U	ND	U	700	7,000				
	Aroclor 1260	µg/kg	EPA 8082	ND	U	ND	U	ND	U	--	--				
	Total PCBs	µg/kg	EPA 8082	ND	U	ND	U	ND	U	371	3,710				

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-56

Terrestrial Ecological - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	660	J	3,790		135	J	1,070		52.2	J	11,200		700	7,000		
	Aroclor 1260	µg/kg	EPA 8082	97.9	U	489	U	17.6	U	86.5	U	9.48	U	958	U	--	--		
	Total PCBs	µg/kg	EPA 8082	966	J	4,950	J	325	J	1,584	J	98.4	J	14,160	J	371	3,710		

Please refer to notes at end of table.

Table C-56

Terrestrial Ecological - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
PCBs	Aroclor 1254	µg/kg	EPA 8082	24,700	J	3,920		11,400		12,000		24,500		4.96		700	7,000		
	Aroclor 1260	µg/kg	EPA 8082	2,030	U	368	U	996	U	947	U	2,090	U	2.67	J	--	--		
	Total PCBs	µg/kg	EPA 8082	31,180	J	4,940	J	15,760	J	14,310	J	28,340	J	7.63	J	371	3,710		

Please refer to notes at end of table.

Table C-56

Terrestrial Ecological - Surface Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/15/2010	Result	Flag		
PCBs	Aroclor 1254	µg/kg	EPA 8082	14.6		2.15	U	700	7,000
	Aroclor 1260	µg/kg	EPA 8082	14.5		9.8		--	--
	Total PCBs	µg/kg	EPA 8082	29.1		9.8		371	3,710

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-57

Terrestrial Ecological - Composite Sample PCBs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	10/15/2010	10/15/2010		
PCBs	Aroclor 1254	µg/kg	EPA 8082	14,700	4,780	J	700	7,000
	Aroclor 1260	µg/kg	EPA 8082	1,030	394	U	--	--
	Total PCBs	µg/kg	EPA 8082	14,700	4,780	J	371	3,710

Notes:

1. -- = Not Applicable/Not Sampled
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS		100410-3-3.2-10-02-FS		100410-3-3.2-15-03-FS		100510-3-3.3-10-02-FS		100510-3-3.3-15-03-FS		090810-3-3.4-00-11-WS		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010		9/8/2010				
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15		0				
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	761		47.3	J	264		6.51	J	4.45	U	48.7	J	--	--			
	Acenaphthene	µg/kg	EPA 8270M	249		19.7	U	800		15.1	J	4.45	U	26.5	J	20,000	200,000			
	Acenaphthylene	µg/kg	EPA 8270M	535		19.7	U	1,470		5.47	J	4.45	U	35.0	J	--	--			
	Anthracene	µg/kg	EPA 8270M	694		19.7	U	4,150		44.6		4.45	U	73.6	J	29,000	290,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	2,460		62.0	J	8,960		83.4		9.32	J	345		5,500	55,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,700		97.1		8,740		90.5		10.9	J	430		5,500	55,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2,250		124		6,270		61.6		11.7	J	472		5,500	55,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1,710		94.1		6,760		51.5		8.68	J	468		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	1,950		69.6	J	5,830		68.5		11.7	J	412		5,500	55,000			
	Chrysene	µg/kg	EPA 8270M	2,840		102		9,990		97.1		17.9	J	475		--	--			
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	489		21.2	J	1,480		16.2	J	4.45	U	113		5,500	55,000			
	Fluoranthene	µg/kg	EPA 8270M	5,710		107		18,600		242		33.4		546		5,500	55,000			
	Fluorene	µg/kg	EPA 8270M	457		19.7	U	1,270		19.6		4.54	J	28.5	J	29,000	290,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1,400		65.9	J	5,100		47.8		7.77	J	372		5,500	55,000			
	Naphthalene	µg/kg	EPA 8270M	1,020		52.7	J	308		20.5		4.45	U	65.6	J	10,000	100,000			
	Phenanthrene	µg/kg	EPA 8270M	2,380		80.1	J	18,100		150		42.4		298		--	--			
	Pyrene	µg/kg	EPA 8270M	5,040		126		24,200		268		37.7		577		5,500	55,000			
	LPAHs	µg/kg	--	6,100		260		26,360		260		70		580		29,000	--			
	HPAHs	µg/kg	--	26,550		870		95,930		1,030		150		4,210		5,500	--			
	Total PAHs	µg/kg	--	32,650		1,130		122,290		1,290		220		4,790		--	--			
	BaP Eq	µg/kg	--	3,840		150		12,390		130		20		670		--	--			

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01		090810-3-3.4-10-02-FS		100510-3-3.5-05-01-FS		100610-3-3.6-15-03 FS		100710-3-3.7-Surface -11FS		100710-3-3.7-5-01-FS		Screening Level	Preliminary Hot Spot Concentration					
				Sample Date		9/8/2010		9/8/2010		10/5/2010		10/6/2010		10/7/2010								
				Depth (Feet Below Ground Surface)		5 - 10		10 - 15		0 - 5		10 - 15		0		0 - 5						
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	386		54.3	J	27.8	J	3.52	U	77.6	J	20.2	J	--	--					
	Acenaphthene	µg/kg	EPA 8270M	49.7	U	20.6	J	27.4	J	3.52	U	56.8	J	17.9	U	20,000	200,000					
	Acenaphthylene	µg/kg	EPA 8270M	108	J	63.3		28.4	J	3.65	J	98.6	J	25.7	J	--	--					
	Anthracene	µg/kg	EPA 8270M	153	J	61.9		54.1		3.52	U	406		38.4	J	29,000	290,000					
	Benzo(a)anthracene	µg/kg	EPA 8270M	1,280		382		339		4.41	J	1,270		144		5,500	55,000					
	Benzo(a)pyrene	µg/kg	EPA 8270M	2,090		646		316		7.02	J	986		214		5,500	55,000					
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2,590		765		742		4.26	J	1,020		204		5,500	55,000					
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,960		811		388		6.16	J	1,010		230		--	--					
	Benzo(k)fluranthene	µg/kg	EPA 8270M	2,010		672		391		4.96	J	831		152		5,500	55,000					
	Chrysene	µg/kg	EPA 8270M	2,050		778		925		5.81	J	1,430		207		--	--					
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	718		203		97.8		3.52	U	225		57.4	J	5,500	55,000					
	Fluoranthene	µg/kg	EPA 8270M	1,220		799		488		10.0	J	3,100		218		5,500	55,000					
	Fluorene	µg/kg	EPA 8270M	121	J	21.0	J	23.0	J	3.52	U	75.4	J	17.9	U	29,000	290,000					
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,070		640		303		4.41	J	749		176		5,500	55,000					
	Naphthalene	µg/kg	EPA 8270M	266		86.2		42.1		17.3		106	J	38.3	J	10,000	100,000					
	Phenanthrene	µg/kg	EPA 8270M	585		380		193		9.16	J	1,520		154		--	--					
	Pyrene	µg/kg	EPA 8270M	1,780		943		586		13.6	J	2,840		256		5,500	55,000					
	LPAHs	µg/kg	--	1,670		690		390		50		2,340		310		29,000	--					
	HPAHs	µg/kg	--	18,770		6,640		4,580		60		13,460		1,860		5,500	--					
	Total PAHs	µg/kg	--	20,440		7,330		4,970		110		15,800		2,170		--	--					
	BaP Eq	µg/kg	--	3,450		1,040		560		12		1,530		330		--	--					

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-1-10		100610-3-3.8-5-01		100710-3-3.9-Surface-10-FS		100710-3-3.9-5-01-FS		100710-3-3.10-Surface -11-WS		100710-3-3.10-5-01-FS		Screening Level	Preliminary Hot Spot Concentration						
				TOB		FS		100710-3-3.9-Surface-10-FS		100710-3-3.9-5-01-FS		100710-3-3.10-Surface -11-WS		100710-3-3.10-5-01-FS									
				Sample Date		10/6/2010		10/6/2010		10/7/2010		10/7/2010		10/7/2010		10/7/2010							
				Depth (Feet Below Ground Surface)		0		0 - 5		0		0 - 5		0		0 - 5							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	82.9	J	60.3	J	20.6		44.4		28.7	J	5.30	J	--	--						
	Acenaphthene	µg/kg	EPA 8270M	15.7	J	85.5		13.7		78.3		12.8	J	3.87	UJ	20,000	200,000						
	Acenaphthylene	µg/kg	EPA 8270M	71.7	J	53.3	J	31.1		40.8		29.6		10.3	J	--	--						
	Anthracene	µg/kg	EPA 8270M	105	J	142		53.3		273		43.7		12.1	J	29,000	290,000						
	Benzo(a)anthracene	µg/kg	EPA 8270M	281	J	653		155		634		182		35.3	J	5,500	55,000						
	Benzo(a)pyrene	µg/kg	EPA 8270M	366	J	681		199		657		300		45.3	J	5,500	55,000						
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	409	J	723		185		637		299		37.1	J	5,500	55,000						
	Benzo(ghi)perylene	µg/kg	EPA 8270M	430	J	644		210		570		361		45.6	J	--	--						
	Benzo(k)fluranthene	µg/kg	EPA 8270M	296	J	576		138		562		205		30.4	J	5,500	55,000						
	Chrysene	µg/kg	EPA 8270M	443	J	877		212		753		261		46.8	J	--	--						
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	94.1	J	173		43.8		151		65.6		8.69	J	5,500	55,000						
	Fluoranthene	µg/kg	EPA 8270M	562	J	1,630		283		1,450		313		65.2	J	5,500	55,000						
	Fluorene	µg/kg	EPA 8270M	21.9	J	77.4		15.5		74.6		15.1	J	3.87	UJ	29,000	290,000						
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	322	J	524		164		473		270		33.6	J	5,500	55,000						
	Naphthalene	µg/kg	EPA 8270M	142	J	104		27.8		76.5		43.4		19.2	J	10,000	100,000						
	Phenanthrene	µg/kg	EPA 8270M	453	J	1,160		161		961		157		39.8	J	--	--						
	Pyrene	µg/kg	EPA 8270M	711	J	1,310		314		1,260		430		80.6	J	5,500	55,000						
	LPAHs	µg/kg	--	900		1,680		330		1,550		330		90		29,000	--						
	HPAHs	µg/kg	--	3,910		7,790		1,900		7,150		2,690		430		5,500	--						
	Total PAHs	µg/kg	--	4,810		9,470		2,230		8,700		3,020		520		--	--						
	BaP Eq	µg/kg	--	570		1,060		300		990		450		70		--	--						

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-10-02-FS		Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/7/2010		
			Depth (Feet Below Ground Surface)	5 - 10			
					Result	Flag	
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	36.4	--	--	--
	Acenaphthene	µg/kg	EPA 8270M	31.8	20,000	200,000	--
	Acenaphthylene	µg/kg	EPA 8270M	19.4	--	--	--
	Anthracene	µg/kg	EPA 8270M	24.5	29,000	290,000	--
	Benzo(a)anthracene	µg/kg	EPA 8270M	17.8	5,500	55,000	--
	Benzo(a)pyrene	µg/kg	EPA 8270M	24.6	5,500	55,000	--
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	19.8	5,500	55,000	--
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.4	--	--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	15.8	5,500	55,000	--
	Chrysene	µg/kg	EPA 8270M	23.6	--	--	--
	Dibenz(a,h)anthracene	µg/kg	EPA 8270M	3.78	U	5,500	55,000
	Fluoranthene	µg/kg	EPA 8270M	83.9	5,500	55,000	--
	Fluorene	µg/kg	EPA 8270M	22.8	29,000	290,000	--
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.6	J	5,500	55,000
	Naphthalene	µg/kg	EPA 8270M	120	10,000	100,000	--
	Phenanthrene	µg/kg	EPA 8270M	104	--	--	--
	Pyrene	µg/kg	EPA 8270M	102	5,500	55,000	--
	LPAHs	µg/kg	--	360	29,000	--	--
	HPAHs	µg/kg	--	330	5,500	--	--
	Total PAHs	µg/kg	--	690	--	--	--
	BaP Eq	µg/kg	--	30	--	--	--

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37						HA-38						Screening Level	Preliminary Hot Spot Concentration				
				Sample Date		12/19/2003		12/19/2003		12/19/2003		12/19/2003		12/19/2003							
				Depth (Feet Below Ground Surface)		Result	Flag														
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag						
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	--	--				
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	20,000	200,000				
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	--	--				
	Anthracene	µg/kg	EPA 8270M	17.4		ND	U	29,000	290,000												
	Benzo(a)anthracene	µg/kg	EPA 8270M	47.9		22.6		32.8		244		205		5,500		55,000					
	Benzo(a)pyrene	µg/kg	EPA 8270M	38.4		10.1		20.2		126		106		5,500		55,000					
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	62.8		10.1		24.4		169		ND	U	5,500		55,000					
	Benzo(ghi)perylene	µg/kg	EPA 8270M	34		<10.0		18.5		219		139		--		--					
	Benzo(k)fluranthene	µg/kg	EPA 8270M	13.9		<10.0		10.1		ND	U	ND	U	5,500		55,000					
	Chrysene	µg/kg	EPA 8270M	41.8		<10.0		11.8		ND	U	ND	U	--		--					
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	11.3		ND	U	ND	U	ND	U	ND	U	5,500		55,000					
	Fluoranthene	µg/kg	EPA 8270M	69.7		10.9		30.3		253		106		5,500		55,000					
	Fluorene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	ND	U	29,000		290,000					
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	30.5		<10.0		15.1		118		ND	U	5,500		55,000					
	Naphthalene	µg/kg	EPA 8270M	11.3		15.1		12.6		ND	U	ND	U	10,000		100,000					
	Phenanthrene	µg/kg	EPA 8270M	43.6		10.9		27.8		228		ND	U	--		--					
	Pyrene	µg/kg	EPA 8270M	68		16.8		51.3		337		115		5,500		55,000					
	LPAHs	µg/kg	--	70		30		40		220		0		29,000		--					
	HPAHs	µg/kg	--	420		70		210		1470		670		5,500		--					
	Total PAHs	µg/kg	--	490		100		250		1690		670		--		--					
	BaP Eq	µg/kg	--	60		--		30		--		--		--		--					

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/18/2003		12/18/2003		12/18/2003					
				Depth (Feet Below Ground Surface)		0.5	2	0.5	2	0.5	2				
PAHs				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Screening Level	Preliminary Hot Spot Concentration		
	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	--	--		
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	20,000	200,000		
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	--	--		
	Anthracene	µg/kg	EPA 8270M	135		261		ND	U	ND	U	29,000	290,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	499		1040		404		142		5,500	55,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	467		988		311		109		5,500	55,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	602		877		404		150		5,500	55,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	348		664		278		112		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	261		340		160		101		5,500	55,000		
	Chrysene	µg/kg	EPA 8270M	578		1640		219		86.1		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	5,500	55,000		
	Fluoranthene	µg/kg	EPA 8270M	720		1190		539		112		5,500	55,000		
	Fluorene	µg/kg	EPA 8270M	ND		111		ND	U	ND	U	29,000	290,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	301	U	450		219		52.4		5,500	55,000		
	Naphthalene	µg/kg	EPA 8270M	ND	U	253		ND	U	ND	U	10,000	100,000		
	Phenanthrene	µg/kg	EPA 8270M	459		1220		185		711		--	--		
	Pyrene	µg/kg	EPA 8270M	689		2040		463		195		5,500	55,000		
	LPAHs	µg/kg	--	590		1840		180		710		29,000	--		
	HPAHs	µg/kg	--	4470		9230		3000		1060		5,500	--		
	Total PAHs	µg/kg	--	5060		11070		3180		1770		--	--		
	BaP Eq	µg/kg	--	610		1240		420		150		--	--		

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/17/2003	12/17/2003	12/16/2003						
				Depth (Feet Below Ground Surface)		0.5	2.5	2						
				Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	32.1		ND	U	20,000	200,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	36.5		ND	U	--	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	343		ND	U	29,000	290,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	86.1		532		270		5,500	55,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	115		903		314		5,500	55,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	118		512		326		5,500	55,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	117		1,130		196		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	83.1		462		239	U	5,500	55,000			
	Chrysene	µg/kg	EPA 8270M	109		684		344	U	--	--			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	19.5		ND	U	5,500	55,000			
	Fluoranthene	µg/kg	EPA 8270M	156		2480		400		5,500	55,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	23		ND	U	29,000	290,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	86.9		703		164		5,500	55,000			
	Naphthalene	µg/kg	EPA 8270M	ND	U	48.2		ND	U	10,000	100,000			
	Phenanthrene	µg/kg	EPA 8270M	79.3		2,230		183		--	--			
	Pyrene	µg/kg	EPA 8270M	191		3,350		607		5,500	55,000			
	LPAHs	µg/kg	--	80		2,710		180		29,000	--			
	HPAHs	µg/kg	--	1060		10,780		2,860		5,500	--			
	Total PAHs	µg/kg	--	1140		13,490		3,040		--	--			
	BaP Eq	µg/kg	--	150		1,110		390		--	--			

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5	2	0.5	2	0.5	2.5				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	10,300		--	--		
	Acenaphthene	µg/kg	EPA 8270M	ND	U	41.3		ND	U	26,900		20,000	200,000		
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	191		ND	U	647		--	--		
	Anthracene	µg/kg	EPA 8270M	ND		178		143		23,300		29,000	290,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	81.9		579		492		20,800		5,500	55,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	110		712		478		12,400		5,500	55,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	109		572		410		10,900		5,500	55,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	132		816		331		1,660		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	105		617		413		12,900		5,500	55,000		
	Chrysene	µg/kg	EPA 8270M	111		719		571		24,500		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	150		90		844		5,500	55,000		
	Fluoranthene	µg/kg	EPA 8270M	150		1250		872		50,500		5,500	55,000		
	Fluorene	µg/kg	EPA 8270M	ND	U	125		ND	U	20,300		29,000	290,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	91		571		268		1,870		5,500	55,000		
	Naphthalene	µg/kg	EPA 8270M	ND	U	357		ND	U	10,900		10,000	100,000		
	Phenanthrene	µg/kg	EPA 8270M	88.5		1,250		577		75,900		--	--		
	Pyrene	µg/kg	EPA 8270M	166		1,690		1,190		53,500		5,500	55,000		
	LPAHs	µg/kg	--	80		2,140		720		168,250		29,000	--		
	HPAHs	µg/kg	--	1060		7,680		5,120		189,870		5,500	--		
	Total PAHs	µg/kg	--	1140		9,820		5,840		358,120		--	--		
	BaP Eq	µg/kg	--	140		1,050		690		16,770		--	--		

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5	2.5	2						
				Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	20,000	200,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	22.7		ND	U	29,000	290,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	50.4		70.6		27.1		5,500	55,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	30.7		46.3		23.8		5,500	55,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	48.8		57.6		19.7		5,500	55,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	23.6		27.6		16.4		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		33.3		21.3		5,500	55,000			
	Chrysene	µg/kg	EPA 8270M	19.7		27.6		19.7		--	--			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND		5,500	55,000			
	Fluoranthene	µg/kg	EPA 8270M	30		77.9		13.9		5,500	55,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	10.6		ND	U	29,000	290,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	14.9		23.5		ND	U	5,500	55,000			
	Naphthalene	µg/kg	EPA 8270M	19.7	U	ND		ND	U	10,000	100,000			
	Phenanthrene	µg/kg	EPA 8270M	27.5		68.2		ND	U	--	--			
	Pyrene	µg/kg	EPA 8270M	76.3		124		41.8		5,500	55,000			
	LPAHs	µg/kg	--	50		100		0		29,000	--			
	HPAHs	µg/kg	--	290		490		180		5,500	--			
	Total PAHs	µg/kg	--	340		590		180		--	--			
	BaP Eq	µg/kg	--	--		60		--		--	--			

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
				Depth (Feet Below Ground Surface)		0.5	2	0.5	Result	Flag	Result
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--	--	--	--
	Acenaphthene	µg/kg	EPA 8270M	50.6		ND	U	ND	U	20,000	200,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	--	--
	Anthracene	µg/kg	EPA 8270M	64.7		ND	U	132		29,000	290,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	1340		73.2		2890		5,500	55,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	2380		97.7		4030		5,500	55,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	2280		119		4070		5,500	55,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	1180		101		3120		--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3230		61.8		3590		5,500	55,000
	Chrysene	µg/kg	EPA 8270M	2730		95.2		3990		--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	486		27.7		1320		5,500	55,000
	Fluoranthene	µg/kg	EPA 8270M	1240		61.8		2910		5,500	55,000
	Fluorene	µg/kg	EPA 8270M	35.7		ND		ND	U	29,000	290,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	1280		85.4		2920		5,500	55,000
	Naphthalene	µg/kg	EPA 8270M	93.7		22		ND	U	10,000	100,000
	Phenanthrene	µg/kg	EPA 8270M	477		35		762		--	--
	Pyrene	µg/kg	EPA 8270M	1310		84.6		3170		5,500	55,000
	LPAHs	µg/kg	--	720		50		890		29,000	--
	HPAHs	µg/kg	--	17460		810		32010		5,500	--
	Total PAHs	µg/kg	--	18180		860		32900		--	--
	BaP Eq	µg/kg	--	3400		150		6410		--	--

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Screening Level	Preliminary Hot Spot Concentration			
				Sample Date		12/22/2003		12/22/2003						
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		--	--			
	Acenaphthene	µg/kg	EPA 8270M	ND	U	52.3		40.3		20,000	200,000			
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	1270		ND	U	--	--			
	Anthracene	µg/kg	EPA 8270M	ND	U	744		45.6		29,000	290,000			
	Benzo(a)anthracene	µg/kg	EPA 8270M	242		3010		334		5,500	55,000			
	Benzo(a)pyrene	µg/kg	EPA 8270M	ND		3270		446		5,500	55,000			
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	10.8		2830		605		5,500	55,000			
	Benzo(ghi)perylene	µg/kg	EPA 8270M	ND		2840		212		--	--			
	Benzo(k)fluranthene	µg/kg	EPA 8270M	ND		3660		313		5,500	55,000			
	Chrysene	µg/kg	EPA 8270M	ND		3470		539		--	--			
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	381		71.5		5,500	55,000			
	Fluoranthene	µg/kg	EPA 8270M	10.8		6790		321		5,500	55,000			
	Fluorene	µg/kg	EPA 8270M	ND	U	208		27.4		29,000	290,000			
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	ND		2020		218		5,500	55,000			
	Naphthalene	µg/kg	EPA 8270M	ND	U	204		49.5		10,000	100,000			
	Phenanthrene	µg/kg	EPA 8270M	ND		4380		189		--	--			
	Pyrene	µg/kg	EPA 8270M	20.9		10800		495		5,500	55,000			
	LPAHs	µg/kg	--	0		6860		360		29,000	--			
	HPAHs	µg/kg	--	280		39070		3550		5,500	--			
	Total PAHs	µg/kg	--	280		45930		3910		--	--			
	BaP Eq	µg/kg	--	--		4510		640		--	--			

Please refer to notes at end of table.

Table C-58

Terrestrial Ecological - Boring Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Screening Level	Preliminary Hot Spot Concentration
				Sample Date		12/22/2003		12/22/2003			
Depth (Feet Below Ground Surface)				Result	Flag	Result	Flag	Result	Flag		
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	ND	U	ND	U	--		--	--
	Acenaphthene	µg/kg	EPA 8270M	ND	U	322		ND	U	20,000	200,000
	Acenaphthylene	µg/kg	EPA 8270M	ND	U	102		ND	U	--	--
	Anthracene	µg/kg	EPA 8270M	44.1		429		11.6		29,000	290,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	84.2		543		26.2		5,500	55,000
	Benzo(a)pyrene	µg/kg	EPA 8270M	40.9		338		11.6		5,500	55,000
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	75.4		338		11.6		5,500	55,000
	Benzo(ghi)perylene	µg/kg	EPA 8270M	46.5		169		ND	U	--	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	78.6		177		ND	U	5,500	55,000
	Chrysene	µg/kg	EPA 8270M	120		1400		ND	U	--	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	5,500	55,000
	Fluoranthene	µg/kg	EPA 8270M	64.2		544		41.7		5,500	55,000
	Fluorene	µg/kg	EPA 8270M	ND	U	940		10		29,000	290,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	26.5		66.8		ND	U	5,500	55,000
	Naphthalene	µg/kg	EPA 8270M	ND	U	ND	U	56.3		10,000	100,000
	Phenanthrene	µg/kg	EPA 8270M	43.3		1190		50.9		--	--
	Pyrene	µg/kg	EPA 8270M	93.1		2170		61		5,500	55,000
	LPAHs	µg/kg	--	90		2980		130		29,000	--
	HPAHs	µg/kg	--	630		5750		150		5,500	--
	Total PAHs	µg/kg	--	720		8730		280		--	--
	BaP Eq	µg/kg	--	60		440		--		--	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-59

Terrestrial Ecological - Surface Sample PAHs Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	112		80.3		76.0		39.3		22.0	J	91.8		--	--		
	Acenaphthene	µg/kg	EPA 8270M	130		101		7.50	J	13.4	J	9.8	J	51.4		20,000	200,000		
	Acenaphthylene	µg/kg	EPA 8270M	63.1	J	86.6		23.9	J	43.9		14.8	J	37.2		--	--		
	Anthracene	µg/kg	EPA 8270M	214		286		43.4		30.1		23.4	J	115		29,000	290,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	428		1,370		106		127		139		318		5,500	55,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	501		967		149		206	J	244		426		5,500	55,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	477		1,570		134		257		240		469		5,500	55,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	483		861		357		327		289		581		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	372		969		105		180		177		372		5,500	55,000		
	Chrysene	µg/kg	EPA 8270M	550		2,180		179		318		217		428		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	109		280		47.5		56.0		72.2		131		5,500	55,000		
	Fluoranthene	µg/kg	EPA 8270M	877		1,870		216		637		234		637		5,500	55,000		
	Fluorene	µg/kg	EPA 8270M	113		103		11.2	J	32.8		12.7	J	43.5		29,000	290,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	361		700		152		216		228		409		5,500	55,000		
	Naphthalene	µg/kg	EPA 8270M	125		150		55.9		124		26.2	J	117		10,000	100,000		
	Phenanthrene	µg/kg	EPA 8270M	1,070		1,110		212		697		191		394		--	--		
	Pyrene	µg/kg	EPA 8270M	924		1,670		259		758		288		618		5,500	55,000		
	LPAHs	µg/kg	--	1,830		1,910		430		980		300		850		29,000	--		
	HPAHs	µg/kg	--	5,080		12,440		1,700		3,080		2,130		4,390		5,500	--		
	Total PAHs	µg/kg	--	6,910		14,350		2,130		4,060		2,430		5,240		--	--		
	BaP Eq	µg/kg	--	750		1,630		240		330		380		690		--	--		

Please refer to notes at end of table.

Table C-59

Terrestrial Ecological - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	192		44.3		94.1		56.6		31.6	J	12.1	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	291		23.4	J	116		20.4	J	17.2	J	5.36	J	20,000	200,000		
	Acenaphthylene	µg/kg	EPA 8270M	166		26.6	J	104		183		34.7		8.73	J	--	--		
	Anthracene	µg/kg	EPA 8270M	2,000		65.3		604		165		60.1		9.12	J	29,000	290,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	5,870		231		1,800		559		210		16.3		5,500	55,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	3,970		284		1,680		705		278		18.7		5,500	55,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	4,060		316		1,710		597		260		42.5		5,500	55,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	2,730		295		1,210		748		315		21.3		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	3,450		219		1,370		467		236		18.8		5,500	55,000		
	Chrysene	µg/kg	EPA 8270M	6,390		316		1,990		685		283		36.6		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	874		71.3		300		135		66.8	J	4.39	J	5,500	55,000		
	Fluoranthene	µg/kg	EPA 8270M	10,300		393		3,910		1150		368	J	41.0	J	5,500	55,000		
	Fluorene	µg/kg	EPA 8270M	366		21.4	J	123		34.0		15.8	J	8.12	J	29,000	290,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	2,430		221		1,010		540		238		15.7		5,500	55,000		
	Naphthalene	µg/kg	EPA 8270M	401		56.5		169		111		54.1		33.8		10,000	100,000		
	Phenanthrene	µg/kg	EPA 8270M	7,490		198		2,080		720		188		35.5		--	--		
	Pyrene	µg/kg	EPA 8270M	11,200		402		3,790		1,340		390		41.0		5,500	55,000		
	LPAHs	µg/kg	--	10,910		430		3,290		1,290		410		110		29,000	--		
	HPAHs	µg/kg	--	51,270		2,750		18,770		6,930		2,640		260		5,500	--		
	Total PAHs	µg/kg	--	62,180		3,180		22,060		8,220		3,050		370		--	--		
	BaP Eq	µg/kg	--	6,150		440		2,460		1,020		420		30		--	--		

Please refer to notes at end of table.

Table C-59

Terrestrial Ecological - Surface Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	9.36	J	4.94	J	--	--		
	Acenaphthene	µg/kg	EPA 8270M	3.92	U	4.23	U	20,000	200,000		
	Acenaphthylene	µg/kg	EPA 8270M	9.18	J	10.3	J	--	--		
	Anthracene	µg/kg	EPA 8270M	9.18	J	6.47	J	29,000	290,000		
	Benzo(a)anthracene	µg/kg	EPA 8270M	25.6		20.1		5,500	55,000		
	Benzo(a)pyrene	µg/kg	EPA 8270M	32.1		28.5		5,500	55,000		
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	40.2		24.5		5,500	55,000		
	Benzo(ghi)perylene	µg/kg	EPA 8270M	29.1		27.9		--	--		
	Benzo(k)fluranthene	µg/kg	EPA 8270M	31.2		20.8		5,500	55,000		
	Chrysene	µg/kg	EPA 8270M	44.7		27.6		--	--		
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	6.82	J	5.53	J	5,500	55,000		
	Fluoranthene	µg/kg	EPA 8270M	66.2		34.0		5,500	55,000		
	Fluorene	µg/kg	EPA 8270M	5.82	J	4.23	U	29,000	290,000		
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	23.6		21.4		5,500	55,000		
	Naphthalene	µg/kg	EPA 8270M	27.2		16.1	J	10,000	100,000		
	Phenanthrene	µg/kg	EPA 8270M	55.1		24.5		--	--		
	Pyrene	µg/kg	EPA 8270M	57.6		48.1		5,500	55,000		
	LPAHs	µg/kg	--	120		70		29,000	--		
	HPAHs	µg/kg	--	360		260		5,500	--		
	Total PAHs	µg/kg	--	480		330		--	--		
	BaP Eq	µg/kg	--	50		40		--	--		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-60

Terrestrial Ecological - Composite Sample PAHs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	Result	Flag	Result	Flag
PAHs	2-Methylnaphthalene	µg/kg	EPA 8270M	63.9			77.1	--
	Acenaphthene	µg/kg	EPA 8270M	26.2	J	22.0	56.6	20,000
	Acenaphthylene	µg/kg	EPA 8270M	31.1	J	31.3	44.1	--
	Anthracene	µg/kg	EPA 8270M	78.9		74.4	128	29,000
	Benzo(a)anthracene	µg/kg	EPA 8270M	202		225	394	5,500
	Benzo(a)pyrene	µg/kg	EPA 8270M	280		280	447	5,500
	Benzo(b)fluoranthene	µg/kg	EPA 8270M	308		289	417	5,500
	Benzo(ghi)perylene	µg/kg	EPA 8270M	342		361	474	--
	Benzo(k)fluranthene	µg/kg	EPA 8270M	267		217	344	5,500
	Chrysene	µg/kg	EPA 8270M	277		317	526	--
	Dibenzo(a,h)anthracene	µg/kg	EPA 8270M	75.3		76.5	112	5,500
	Fluoranthene	µg/kg	EPA 8270M	463		404	724	5,500
	Fluorene	µg/kg	EPA 8270M	27.2	J	23.0	J	29,000
	Indeno(1,2,3-cd)pyrene	µg/kg	EPA 8270M	246		257	370	5,500
	Naphthalene	µg/kg	EPA 8270M	86.6		69.9	118	10,000
	Phenanthrene	µg/kg	EPA 8270M	265		270	511	--
	Pyrene	µg/kg	EPA 8270M	394		433	738	5,500
	LPAHs	µg/kg	--	580		530	980	29,000
	HPAHs	µg/kg	--	2,850		2,860	4,550	5,500
	Total PAHs	µg/kg	--	3,430		3,390	5,530	--
	BaP Eq	µg/kg	--	440		440	690	--

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7- Surface - 11FS	100710-3-3.7- 5-01-FS	100610-3-3.8-1-10-TOB	100610-3-3.8-5-01-FS	100710-3-3.9- Surface-10-FS	100710-3-3.9- 5-01-FS	Primary Screening Level	Primary Hotspot Level						
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0								
					Result	Flag	Result	Flag	Result	Flag							
SVOCs	Dibenzofuran	µg/kg	EPA 8082	301	U	152	U	320	U	312	U	148	U	314	U	2	20

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Primary Hotspot Level
				Sample Date		12/19/2003		12/19/2003		12/19/2003			
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5		1.5	
SVOCs	Dibenzofuran	µg/kg	EPA 8082	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	ND	U
												2	20

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Primary Hotspot Level		
				Sample Date		12/18/2003		12/18/2003		12/18/2003					
Depth (Feet Below Ground Surface)				0.5	2	0.5	2	Result	Flag	Result	Flag	Result	Flag	Result	Flag
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	ND	U	ND	U	2	20

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34			Primary Screening Level	Primary Hotspot Level		
				Sample Date		12/17/2003	12/17/2003		12/16/2003				
				Depth (Feet Below Ground Surface)		0.5	2.5		2				
				Result	Flag	Result	Flag	Result	Flag				
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	2	20		

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Primary Hotspot Level		
				Sample Date		Depth (Feet Below Ground Surface)		Result		Flag		Result			
				2/24/2004	2/24/2004	0.5	2	Result	Flag	Result	Flag	Result	Flag		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	ND	U	13,200		2	20		

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Primary Hotspot Level			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	2	20			

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Primary Hotspot Level		
				Sample Date		12/22/2003		12/22/2003		12/22/2003			
				Depth (Feet Below Ground Surface)		0.5		2.5		5			
				Result	Flag	Result	Flag	Result	Flag	Result	Flag		
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--	--	2	20		

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Primary Hotspot Level
				Sample Date		2/24/2004		2/24/2004			
Depth (Feet Below Ground Surface)				0.5		2.5		5			
SVOCs	Dibenzofuran	µg/kg	EPA 8082	Result	Flag	Result	Flag	Result	Flag		
				ND	U	ND	U	--		2	20

Please refer to notes at end of table.

Table C-61

Boring Sample SVOCs Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Primary Hotspot Level			
				Sample Date		12/22/2003		12/22/2003		12/22/2003				
				Depth (Feet Below Ground Surface)		0.5		2.5		5				
				Result	Flag	Result	Flag	Result	Flag					
SVOCs	Dibenzofuran	µg/kg	EPA 8082	ND	U	ND	U	--		2	20			

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/4/2010	10/4/2010	10/4/2010	10/5/2010	10/5/2010								
				Depth (Feet Below Ground Surface)	0 - 5	5 - 10	10 - 15	5 - 10	10 - 15								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	766		80.2	U	2,070	U	17.0	U	18.1	U	1,170		22,500	225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-01-FS	090810-3-3.4-10-02-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03 FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	9/8/2010	10/5/2010	10/6/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	5 - 10	10 - 15	0 - 5	10 - 15	0								
				Result	Flag	Result	Flag	Result	Flag								
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	807	U	29.8	U	683		14.3	U	10,000		187	J	22,500	225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	TOB	100610-3-3.8-1-10	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	Screening Level	Preliminary Hot Spot Concentration					
				Sample Date	10/7/2010	10/7/2010	10/6/2010	10/6/2010	10/7/2010	10/7/2010							
				Depth (Feet Below Ground Surface)	0	0 - 5	0	0 - 5	0	0 - 5							
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	10,000		187	J	27,100		773		252		4,610		22,500	225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.10-Surface -11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration
				Sample Date	10/7/2010	10/7/2010		
				Depth (Feet Below Ground Surface)	0	0 - 5		
				Result	Flag	Result	Flag	Result
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	578		72.2	J	15.3
							U	22,500
								225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/19/2003		12/19/2003		12/19/2003		12/19/2003					
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	682		ND	U	22,500	225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/18/2003		12/18/2003		12/18/2003		12/18/2003					
Depth (Feet Below Ground Surface)				0.5		2		0.5		2					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	22,500	225,000		

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41			HA-34		Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/17/2003	12/17/2003		12/16/2003			
				Depth (Feet Below Ground Surface)		0.5	2.5		2			
				Result		Flag	Result		Flag			
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U		ND	U	ND	U	22,500	225,000

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	ND	U	ND	U	22,500	225,000		

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	586		22,500	225,000		

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	765		ND	U	--		22,500	225,000		

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	1050		--		22,500	225,000		

Please refer to notes at end of table.

Table C-62

Terrestrial Ecological - Boring Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	ND	U	ND	U	--		22,500	225,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-63

Terrestrial Ecological - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	165		527		69.9	U	129	J	75.5	U	10,800		22,500	225,000		

Please refer to notes at end of table.

Table C-63

Terrestrial Ecological - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	5,370		974		710	J	5,320		2,110		15.0	U	22,500	225,000		

Please refer to notes at end of table.

Table C-63

Terrestrial Ecological - Surface Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration
				Sample Date		10/15/2010	10/15/2010		
				Result	Flag	Result	Flag		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	26.7	J	17.1	U	22,500	225,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

Table C-64

Terrestrial Ecological - Composite Sample Phthalates Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-	101510-3-3.8-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration
				Composite-07-FS	Composite-11-FS	Composite-14-FS		
				Sample Date	10/15/2010	10/15/2010		
Phthalates	Bis(2-ethylhexyl)phthalate	µg/kg	EPA 8270M	31,200		1,370		670
								22,500
								225,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. Highlighting indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. Highlighting indicates a concentration above the primary hot spot concentrations

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100410-3-3.2-5-01-FS	100410-3-3.2-10-02-FS	100410-3-3.2-15-03-FS	100510-3-3.3-10-02-FS	100510-3-3.3-15-03-FS	090810-3-3.4-00-11-WS	Screening Level	Preliminary Hot Spot Concentration							
				Sample Date		10/4/2010		10/4/2010		10/4/2010		10/5/2010		10/5/2010		9/8/2010		
				Depth (Feet Below Ground Surface)		0 - 5		5 - 10		10 - 15		5 - 10		10 - 15		0		
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag			
Organotins	Tributyltin	µg/kg	PSEP	0.94	U	1.0	U	1.1	UJ	1.1	U	1.2	U	23		140,000	1,400,000	

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	090810-3-3.4-5-01-FS	100510-3-3.5-05-01-FS	100610-3-3.6-15-03-FS	100710-3-3.7-Surface -11FS	100710-3-3.7-5-01-FS	100610-3-3.8-1-10-TOB	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	9/8/2010	10/5/2010	10/6/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	5 - 10	0 - 5	10 - 15	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag	Result	Flag						
Organotins	Tributyltin	µg/kg	PSEP	1.1	U	2.9		0.9	U	0.91	U	0.90	U	9.9		140,000	1,400,000

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100610-3-3.8-5-01-FS	100710-3-3.9-Surface-10-FS	100710-3-3.9-5-01-FS	100710-3-3.10-Surface-11-WS	100710-3-3.10-5-01-FS	100710-3-3.10-10-02-FS	Screening Level	Preliminary Hot Spot Concentration						
				Sample Date	10/6/2010	10/7/2010	10/7/2010	10/7/2010	10/7/2010								
				Depth (Feet Below Ground Surface)	0 - 5	0	0 - 5	0	0 - 5								
				Result	Flag	Result	Flag	Result	Flag								
Organotins	Tributyltin	µg/kg	PSEP	0.98	U	30		0.99	U	0.91	U	0.97	UJ	0.95	U	140,000	1,400,000

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-37				HA-38				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/19/2003		12/19/2003		12/19/2003		12/19/2003					
Depth (Feet Below Ground Surface)				0.5		2.5		2.5 DUP		0.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	8.44		ND	U	ND	U	ND	U	ND	U		
												140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-39				HA-40				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				12/18/2003		12/18/2003		12/18/2003		12/18/2003					
Depth (Feet Below Ground Surface)				0.5		2		0.5		2					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	10.5		ND	U	140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-41				HA-34		Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/17/2003		12/17/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	6.05		140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	HA-42				HA-43				Primary Screening Level	Preliminary Hot Spot Concentration		
Sample Date				2/24/2004		2/24/2004		2/24/2004		2/24/2004					
Depth (Feet Below Ground Surface)				0.5		2		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	ND	U	15.7		140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-312						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	--		--		--		140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-313						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	ND	U	--		140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-314						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		2/24/2004		2/24/2004					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	ND	U	15.9		--		140,000	1,400,000		

Please refer to notes at end of table.

Table C-65

Terrestrial Ecological - Boring Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	GP-315						Primary Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		12/22/2003		12/22/2003					
				Depth (Feet Below Ground Surface)		0.5		2.5					
				Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	26.1		ND	U	--		140,000	1,400,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-66

Terrestrial Ecological - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-1		S3-2		S3-3		S3-4		S3-5		S3-6		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
						Result	Flag												
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	1.0	U	1.1	U	1.1	U	1.1	U	1.2	U	140,000	1,400,000		

Please refer to notes at end of table.

Table C-66

Terrestrial Ecological - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-7		S3-8		S3-9		S3-10		S3-11		S3-12		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010		10/15/2010		10/15/2010		10/15/2010		10/15/2010					
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.0	U	0.89	U	1.0	U	0.94	U	1.0	U	0.97	U	140,000	1,400,000		

Please refer to notes at end of table.

Table C-66

Terrestrial Ecological - Surface Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	S3-13		S3-14		Screening Level	Preliminary Hot Spot Concentration		
				Sample Date		10/15/2010					
				Result	Flag	Result	Flag				
Organotins	Tributyltin	µg/kg	PSEP	1.1	U	0.98	U	140,000	1,400,000		

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-67

Terrestrial Ecological - Composite Sample Organotins Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	101510-3-3.7-Composite-07-FS	101510-3-3.8-Composite-11-FS	101510-3-3.9-Composite-14-FS	Screening Level	Preliminary Hot Spot Concentration			
				Sample Date	10/15/2010	10/15/2010					
				Result	Flag	Result					
Organotins	Tributyltin	µg/kg	PSEP	34		1.0	U	0.98	U	140,000	1,400,000

Notes:

1. -- = Not Applicable/Not Analyzed
2. µg/kg = micrograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations
8. PSEP = Puget Sound Estuary Program method.

Table C-68

Terrestrial Ecological - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	100710-3-3.7-	101510-3-3.7-	100610-3-3.8-	101510-3-3.8-	100710-3-3.9-	101510-3-3.9-	Screening Level	Preliminary Hot Spot Concentration						
				Composite-12-WS	Composite-07-FS	Composite WS	Composite-11-FS	Composite-11-WS	Composite-14-FS								
				Sample Date		10/7/2010	10/15/2010	10/6/2010	10/15/2010	10/7/2010	10/15/2010	Result	Flag	Result	Flag	Result	Flag
Dioxins/Furans	1,2,3,4,6,7,8-HxCDD	ng/kg	EPA 8290	120		4,600	J	79		1,200		100		1,500		--	--
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	42		890		26		290		35		650		--	--
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	5.7		140		2.7	J	34		4.3	J	73		--	--
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	1.8	J	49		0.9	J	9.8		0.93	J	13		--	--
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	17		280		6.9		57		11		210		--	--
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	5.9		170		4.2	J	51		4.7	J	77		--	--
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	8.2		180		3.5	J	39		5.4		110		--	--
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	4.7	J	95		1.7	J	20		3.0	J	36		--	--
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	0.7	J	21		0.52	U	2.6		0.36	J	9.3		--	--
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	1.1	J	24		0.73	J	7.7		0.22	U	13		--	--
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	6.1		170		2.7	J	29		4.3	J	96		--	--
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	6.5		180		3.0	J	34		4.0	J	110		--	--
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	12		440		5.5		68	8.6		210		5.67	57	
	2,3,7,8-TCDD	ng/kg	EPA 8290	0.51	J	6.3		0.35	J	2.9	0.069	U	4.6		--	--	
	2,3,7,8-TCDF	ng/kg	EPA 8290	11		330		5.1		89	15		200		--	--	
	OCDD	ng/kg	EPA 8290	1,200		28,000	J	970		10,000	J	1,200		14,000	J	--	--
	OCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total HpCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total HpCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total HxCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total HxCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total PeCDD	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total PeCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--
	Total TCDD	ng/kg	EPA 8290	12		83		3.4		23		1.6		47		2.31	--
	Total TCDF	ng/kg	EPA 8290	--		--		--		--		--		--		--	--

Please refer to notes at end of table.

Table C-68

Terrestrial Ecological - Composite Sample Dioxins/Furans Results

Schnitzer ASD Yard Riverbank Feasibility Study

Gunderson, LLC. - Portland, Oregon

Group	Constituent	Units	Analytical Method	2468-001-SA P4B0481	2468-001-SA P4B0481	2468-001-SA P4B0481	Screening Level	Preliminary Hot Spot Concentration
				HA43A-2.0	HA42A-2.0	GP314AA-1.5		
				Sample Date		Result	Flag	Result
Dioxins/Furans	1,2,3,4,6,7,8-HpCDD	ng/kg	EPA 8290	5970		2,310		1680
	1,2,3,4,6,7,8-HpCDF	ng/kg	EPA 8290	1890		673		489
	1,2,3,4,7,8,9-HpCDF	ng/kg	EPA 8290	216.0		109		65.5
	1,2,3,4,7,8-HxCDD	ng/kg	EPA 8290	80.9		90		15.9
	1,2,3,4,7,8-HxCDF	ng/kg	EPA 8290	729		512		181
	1,2,3,6,7,8-HxCDD	ng/kg	EPA 8290	315.0		222		82
	1,2,3,6,7,8-HxCDF	ng/kg	EPA 8290	391.0		180		91.2
	1,2,3,7,8,9-HxCDD	ng/kg	EPA 8290	160.0		109		35.9
	1,2,3,7,8,9-HxCDF	ng/kg	EPA 8290	149.0		78		40.3
	1,2,3,7,8-PeCDD	ng/kg	EPA 8290	65.5		68		13
	1,2,3,7,8-PeCDF	ng/kg	EPA 8290	349.0		148		78.2
	2,3,4,6,7,8-HxCDF	ng/kg	EPA 8290	564.0		110		130
	2,3,4,7,8-PeCDF	ng/kg	EPA 8290	807		139		171
	2,3,7,8-TCDD	ng/kg	EPA 8290	17.10		5.2		4.44
	2,3,7,8-TCDF	ng/kg	EPA 8290	730		108		198
	OCDD	ng/kg	EPA 8290	56,500		12,400		16,400
	OCDF	ng/kg	EPA 8290	2,690		562		806
	Total HpCDD	ng/kg	EPA 8290	--		--		--
	Total HpCDF	ng/kg	EPA 8290	--		--		--
	Total HxCDD	ng/kg	EPA 8290	--		--		--
	Total HxCDF	ng/kg	EPA 8290	--		--		--
	Total PeCDD	ng/kg	EPA 8290	--		--		--
	Total PeCDF	ng/kg	EPA 8290	--		--		--
	Total TCDD	ng/kg	EPA 8290	--		--		2.31
	Total TCDF	ng/kg	EPA 8290	--		--		--

Notes:

1. -- = Not Applicable/Not Analyzed
2. ng/kg = nanograms per kilogram
3. J = the result is an estimated quantity
4. U= undetected at the method detection limit shown
5. UJ = undetected at the method detection limit shown, detection limit is an estimated quantity
6. **Highlighting** indicates a concentration above the primary screening level. The primary screening level is the lowest applicable SLV or PRG.
7. **Highlighting** indicates a concentration above the primary hot spot concentrations

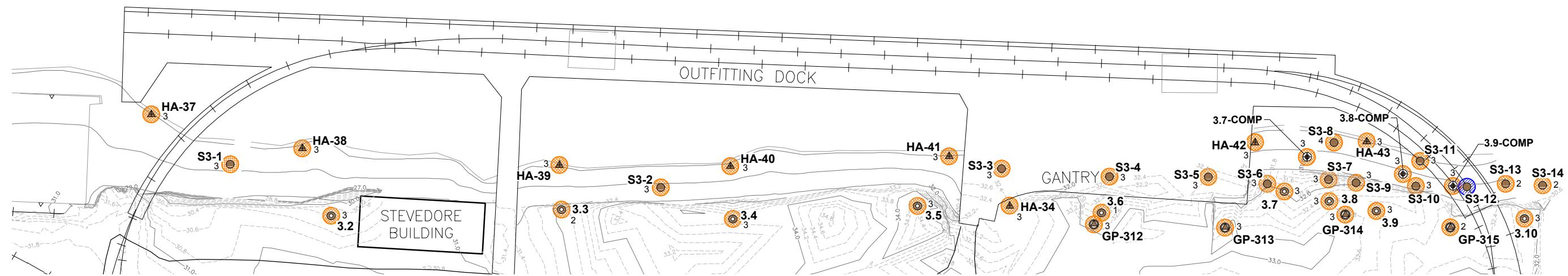
Appendix D

Screening Summary Figures

Screening Levels

WILLAMETTE RIVER

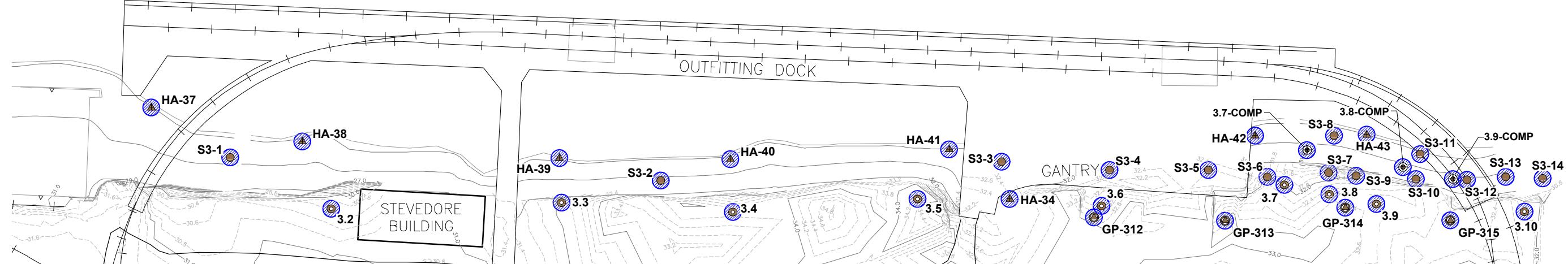
NAVIGATION CHANNEL



Hot Spots

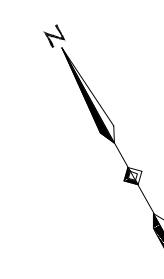
WILLAMETTE RIVER

NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Human Health Sediment Screening Level or Hot Spot Concentration
(Total Number of Metals Detected Above the Applicable Screening Level)
- Does Not Exceed Human Health Sediment Screening Level or Hot Spot Concentration



0 100 200
Scale in Feet

NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Sediment Screening Summary - Metals

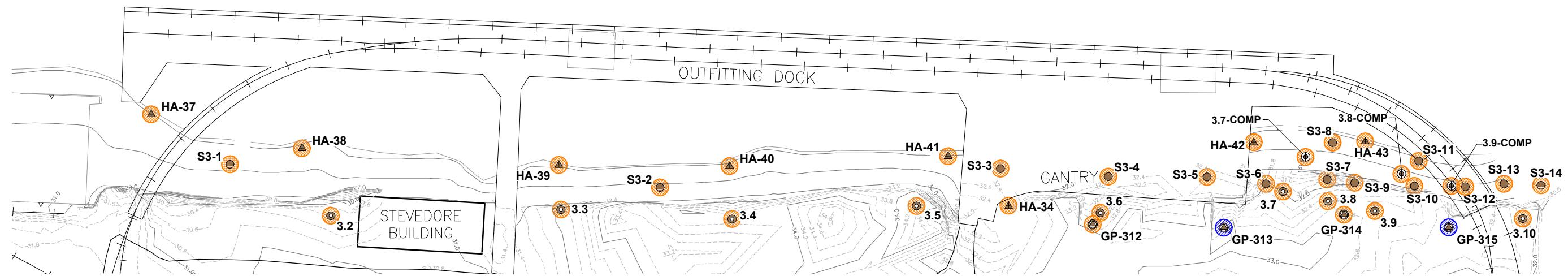
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure
		June 2014	D-1

Screening Levels

WILLAMETTE RIVER

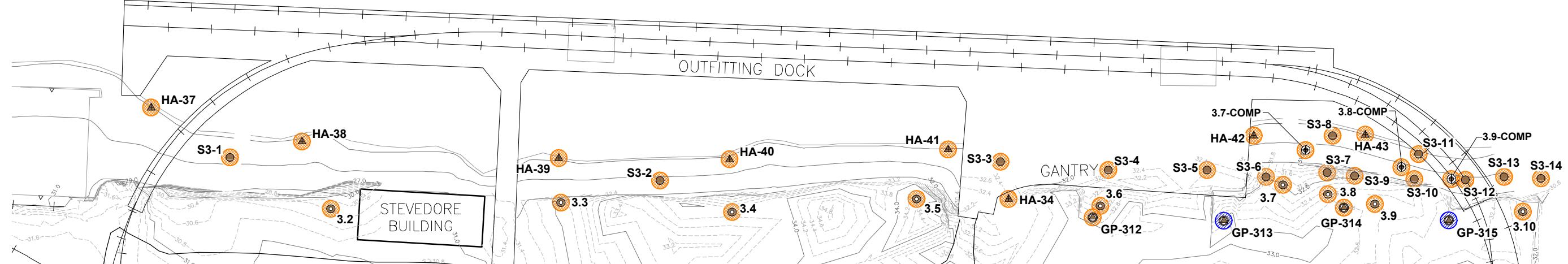
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

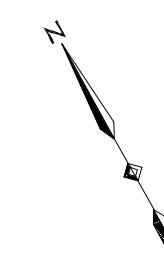
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Human Health Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Human Health Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Sediment Screening Summary - Total Polychlorinated Biphenyls

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



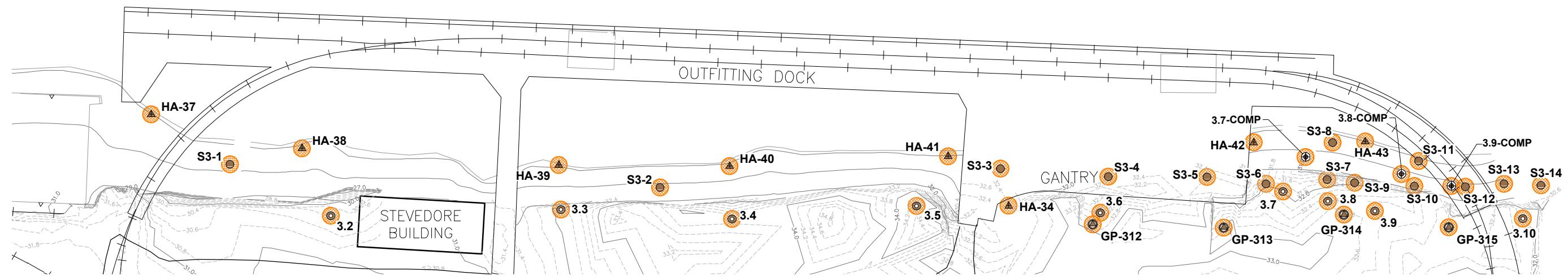
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-2

Screening Levels

WILLAMETTE RIVER

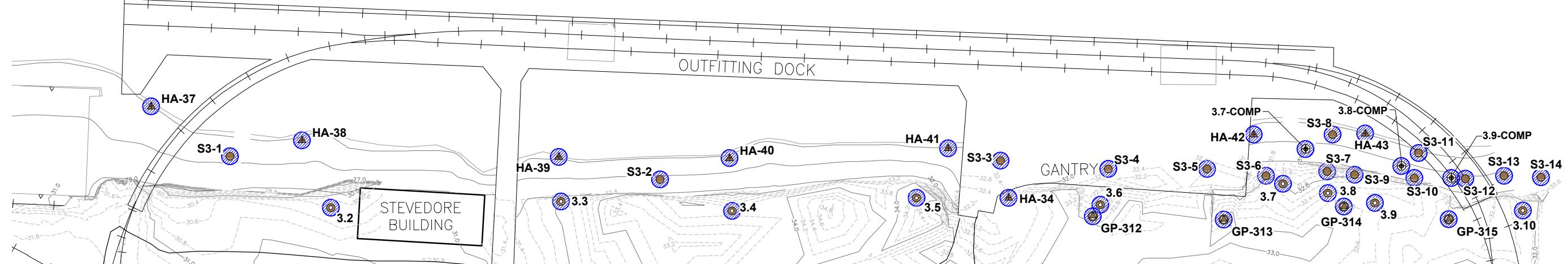
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

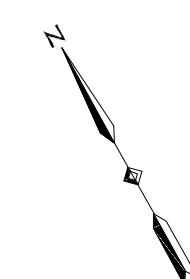
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓢ Geoprobe Location
- Exceeds Human Health Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Human Health Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Sediment Screening Summary - Polycyclic Aromatic Hydrocarbons

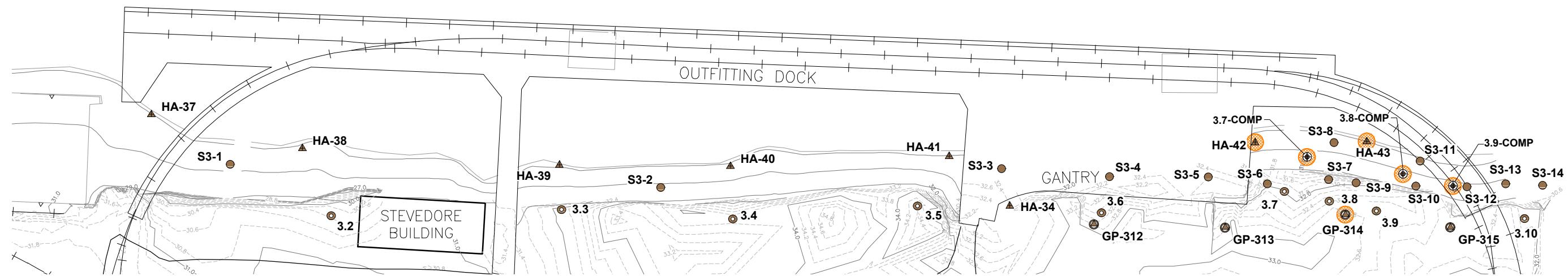
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure
		June 2014	D-3

Screening Levels

WILLAMETTE RIVER

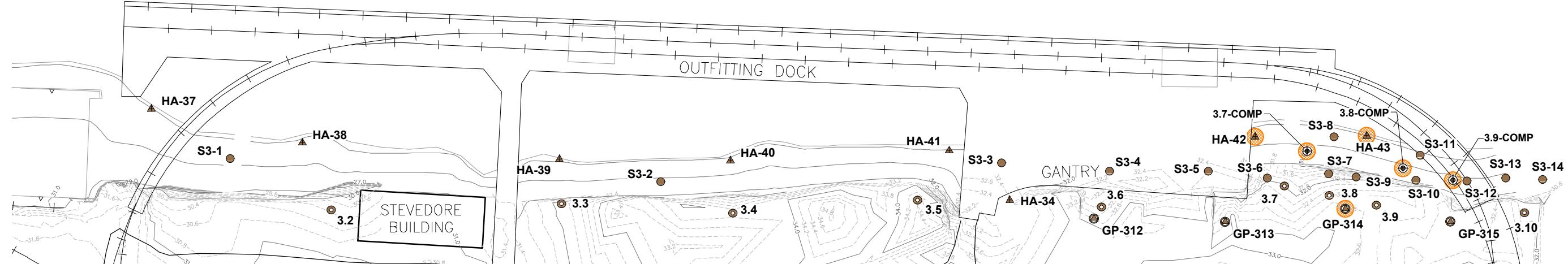
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

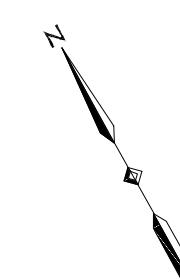
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓢ Geoprobe Location
- Exceeds Human Health Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Human Health Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Sediment Screening Summary - Dioxins/Furans

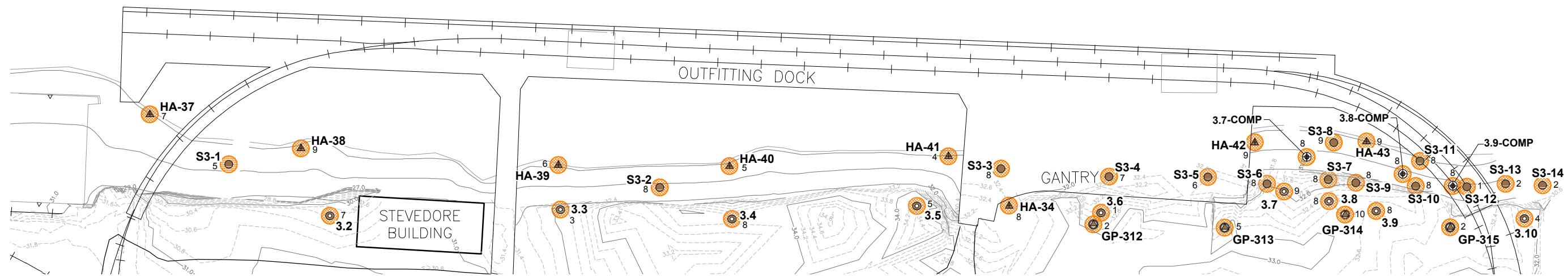
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure
		June 2014	D-4

Screening Levels

WILLAMETTE RIVER

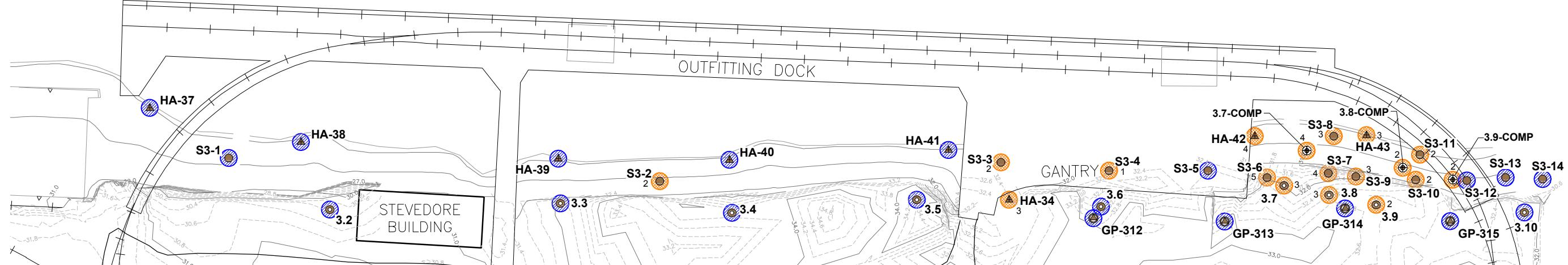
NAVIGATION CHANNEL



Hot Spots

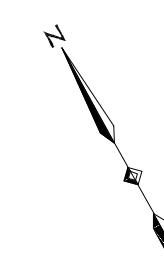
WILLAMETTE RIVER

NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
(Total Number of Metals Detected Above the Applicable Screening Level)
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration



0 100 200
Scale in Feet

NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Ecological Sediment Screening Summary - Metals

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



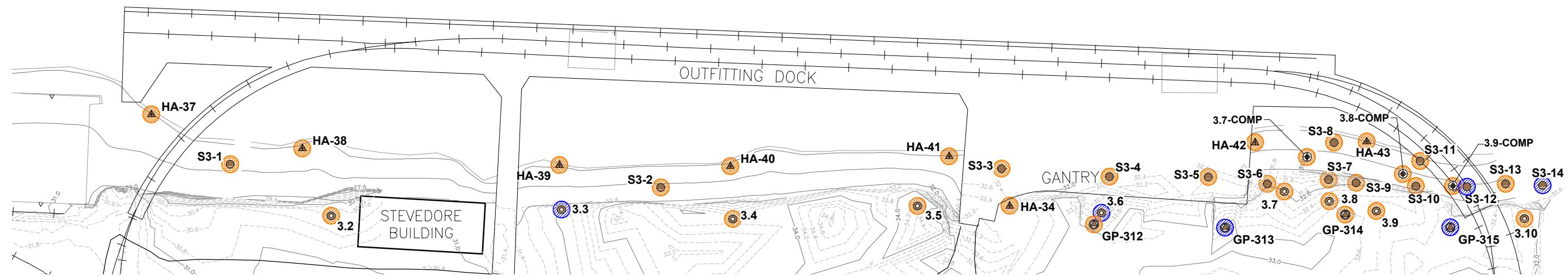
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-5

Screening Levels

WILLAMETTE RIVER

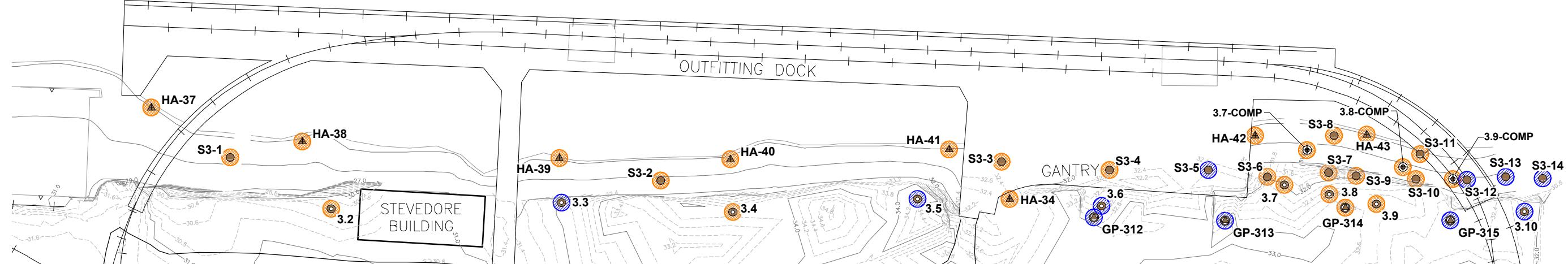
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

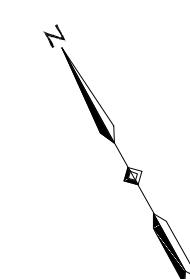
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Ecological Sediment Screening Summary - Total Polychlorinated Biphenyls

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

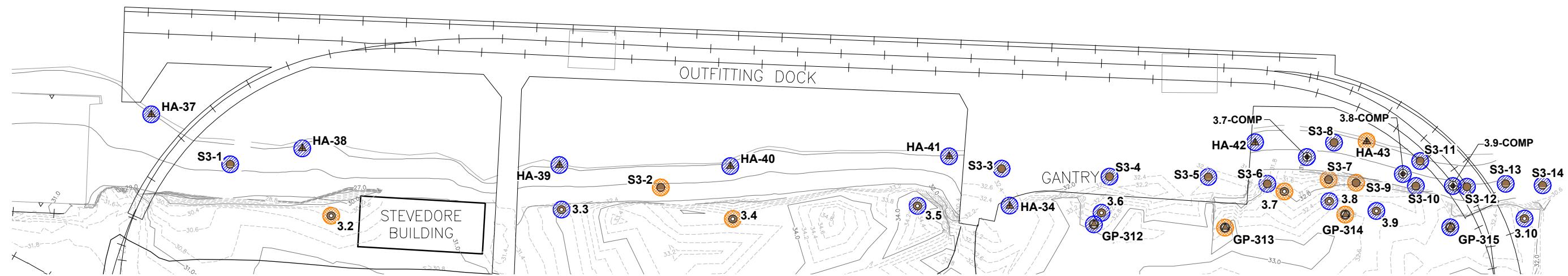
Project Number 1935-03
June 2014

Figure D-6

Screening Levels

WILLAMETTE RIVER

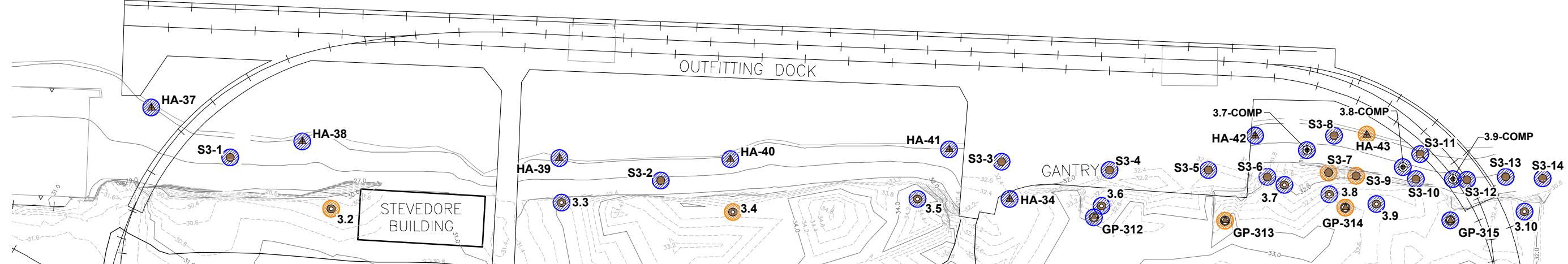
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

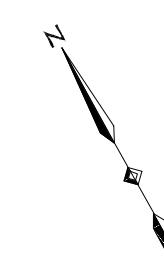
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Ecological Sediment Screening Summary - Polycyclic Aromatic Hydrocarbons

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

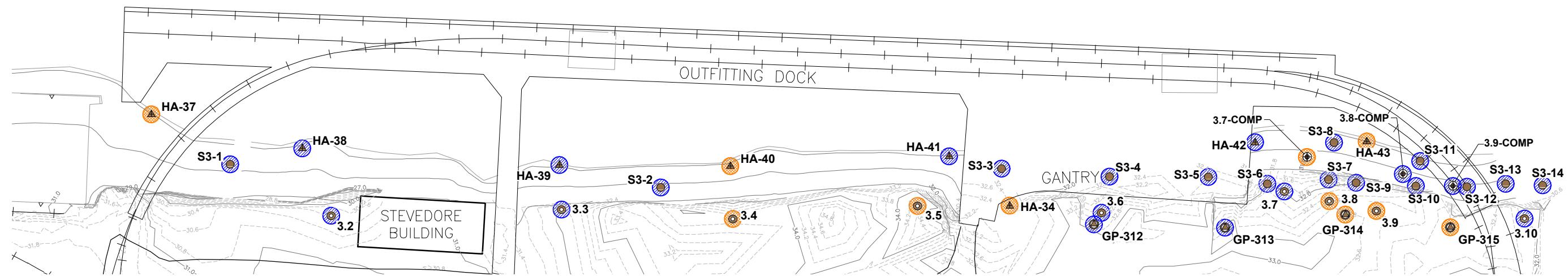
Project Number 1935-03
June 2014

Figure D-7

Screening Levels

WILLAMETTE RIVER

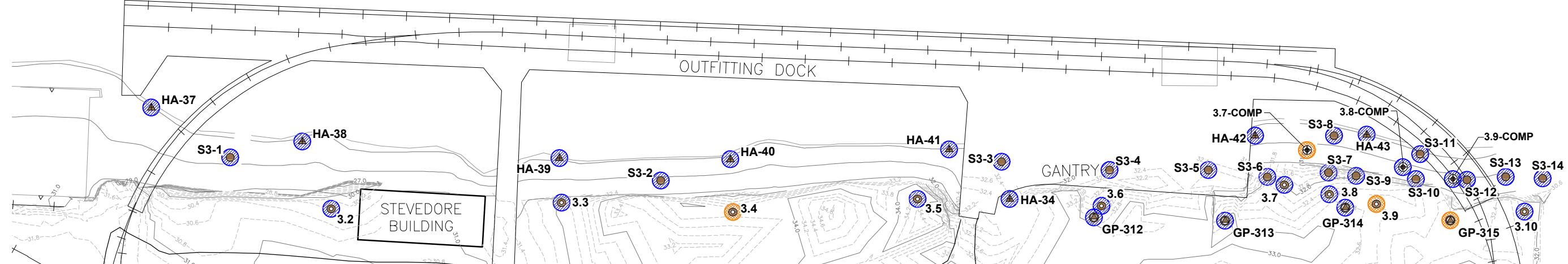
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

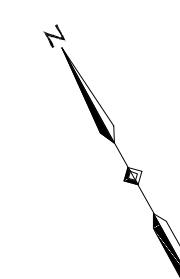
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Ecological Sediment Screening Summary - Tributyltin

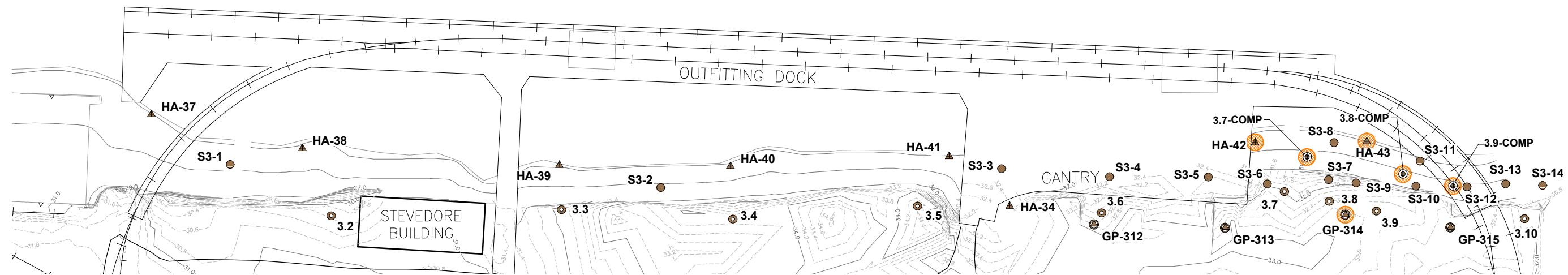
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure
		June 2014	D-8

Screening Levels

WILLAMETTE RIVER

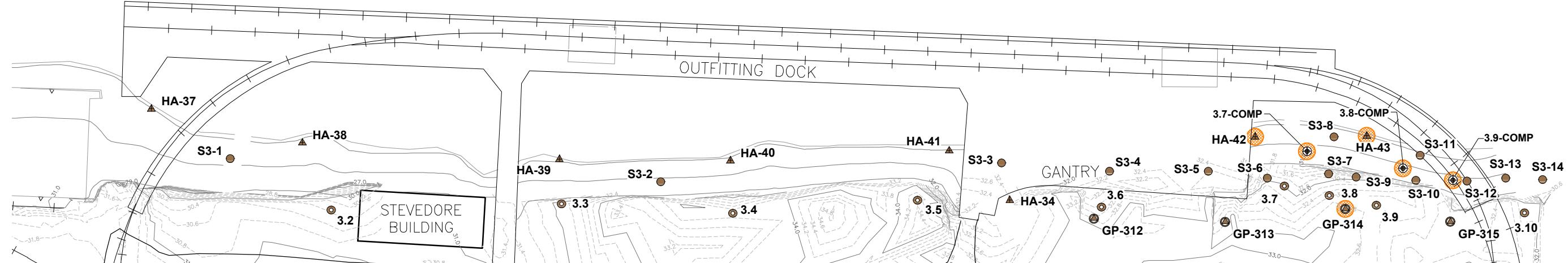
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

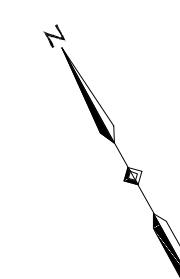
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓢ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Ecological Sediment Screening Summary - Dioxins/Furans

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

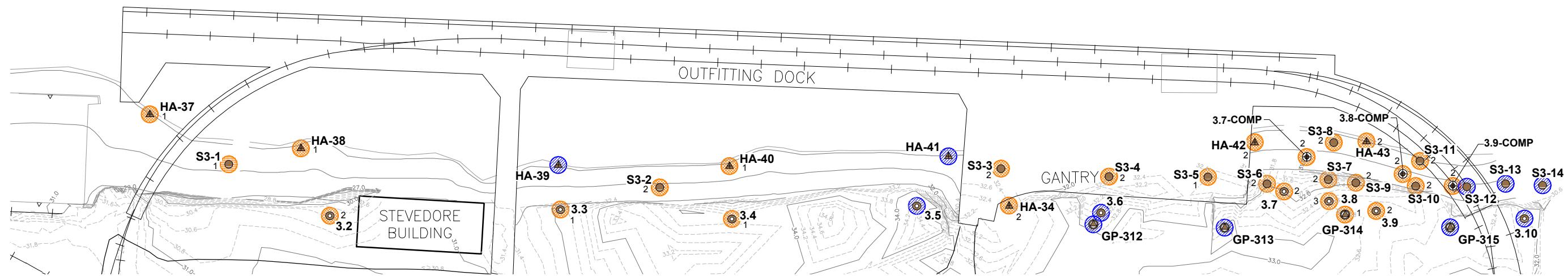
Project Number 1935-03
June 2014

Figure D-9

Screening Levels

WILLAMETTE RIVER

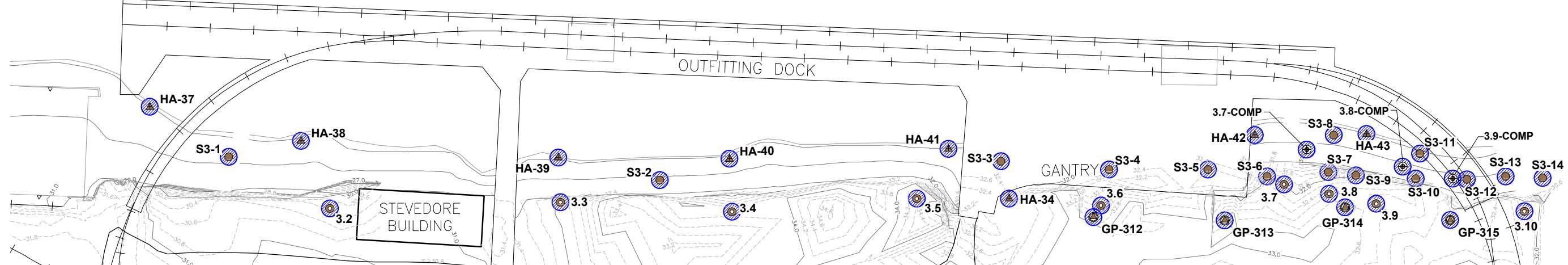
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

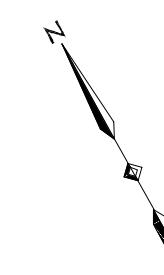
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Human Health Soil Screening Level or Hot Spot Concentration
(Total Number of Metals Detected Above the Applicable Screening Level)
- Does Not Exceed Human Health Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Upland Screening Summary - Metals

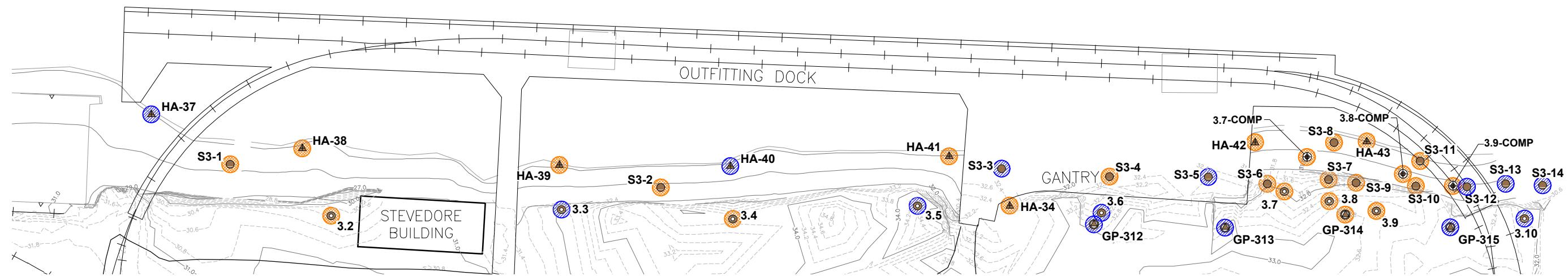
Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure
		June 2014	D-10

Screening Levels

WILLAMETTE RIVER

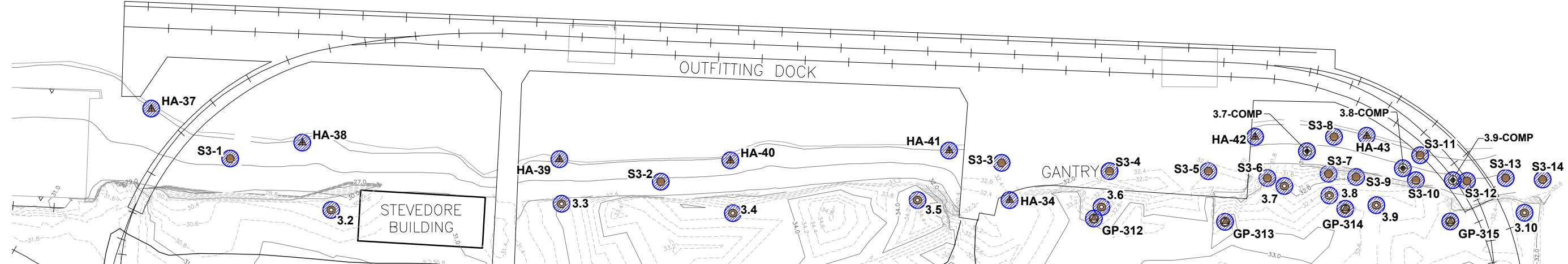
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

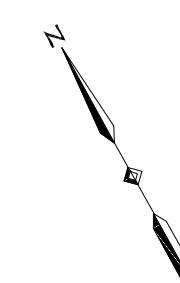
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓢ Geoprobe Location
- Exceeds Human Health Soil Screening Level or Hot Spot Concentration
- Does Not Exceed Human Health Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Upland Screening Summary - Total Polychlorinated Biphenyls

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



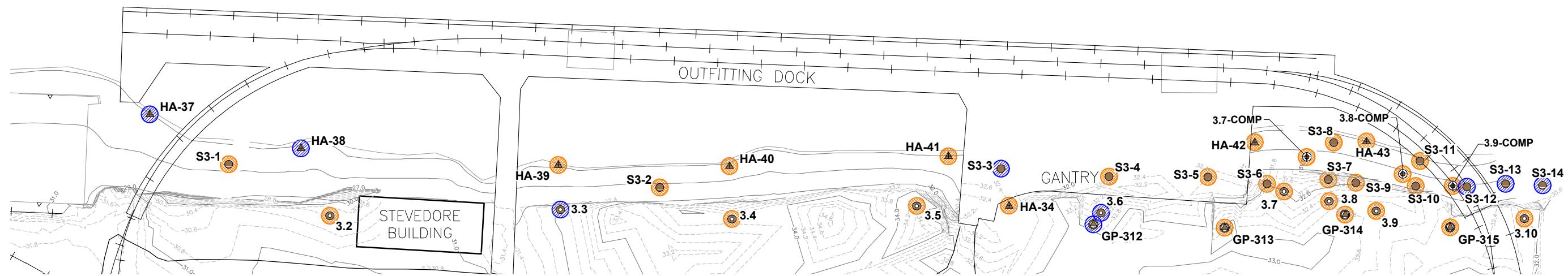
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-11

Screening Levels

WILLAMETTE RIVER

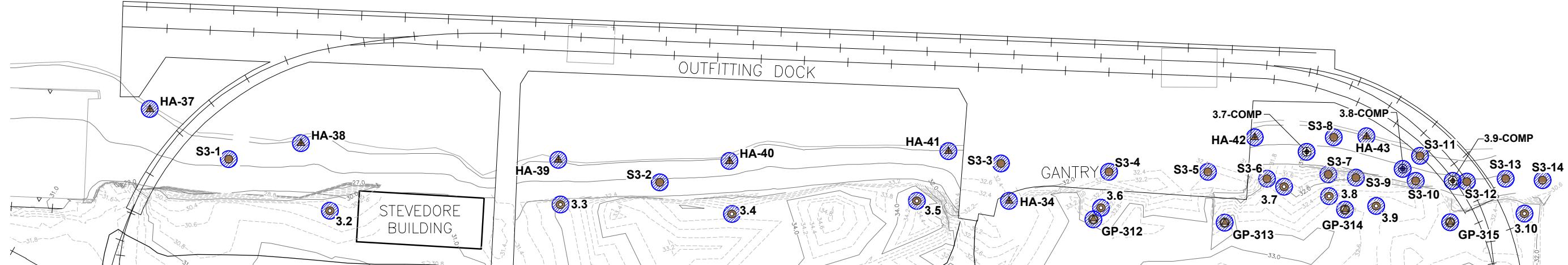
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

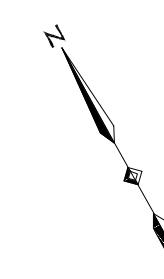
NAVIGATION CHANNEL



Legend:

- 3.10 (●) Vector Borehole Location
- S3-14 (●) Riverbank Surface Sample Location
- 3.9-COMP (⊕) Composite Riverbank Sample Location
- HA-41 (▲) Surface Sediment Station Location
- GP-314 (◎) Geoprobe Location
- (Orange Circle) Exceeds Human Health Soil Screening Level or Hot Spot Concentration
- (Blue Circle) Does Not Exceed Human Health Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Human Health Upland Screening Summary - Polycyclic Aromatic Hydrocarbons

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



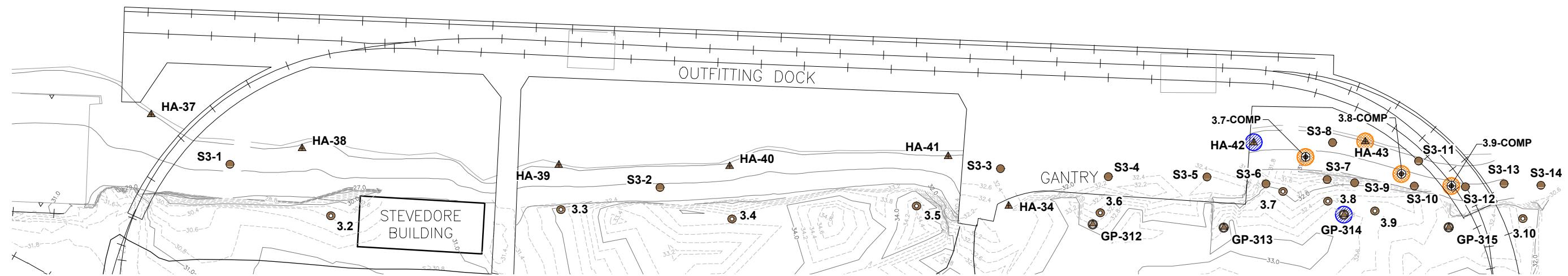
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-12

Screening Levels

WILLAMETTE RIVER

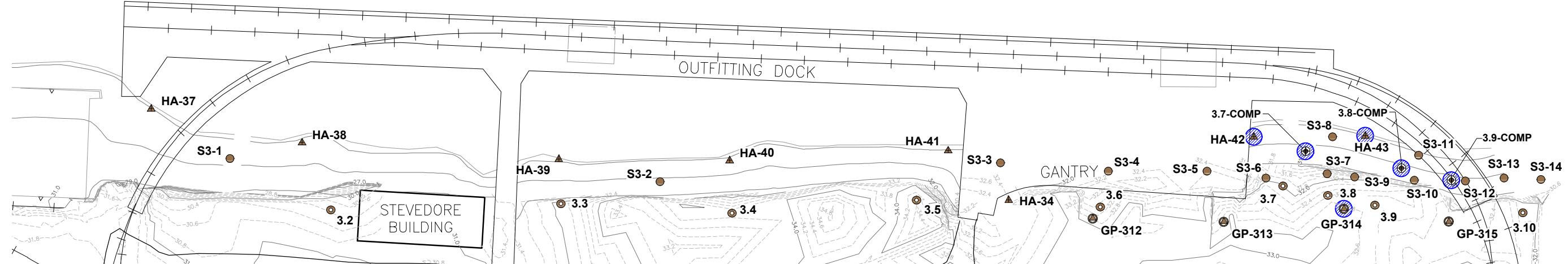
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

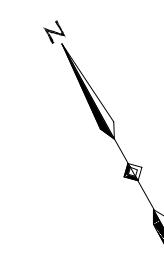
NAVIGATION CHANNEL



Legend:

- 3.10 (●) Vector Borehole Location
- S3-14 (●) Riverbank Surface Sample Location
- 3.9-COMP (⊕) Composite Riverbank Sample Location
- HA-41 (▲) Surface Sediment Station Location
- GP-314 (◎) Geoprobe Location
- (●) Exceeds Human Health Soil Screening Level or Hot Spot Concentration
- (⊕) Does Not Exceed Human Health Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

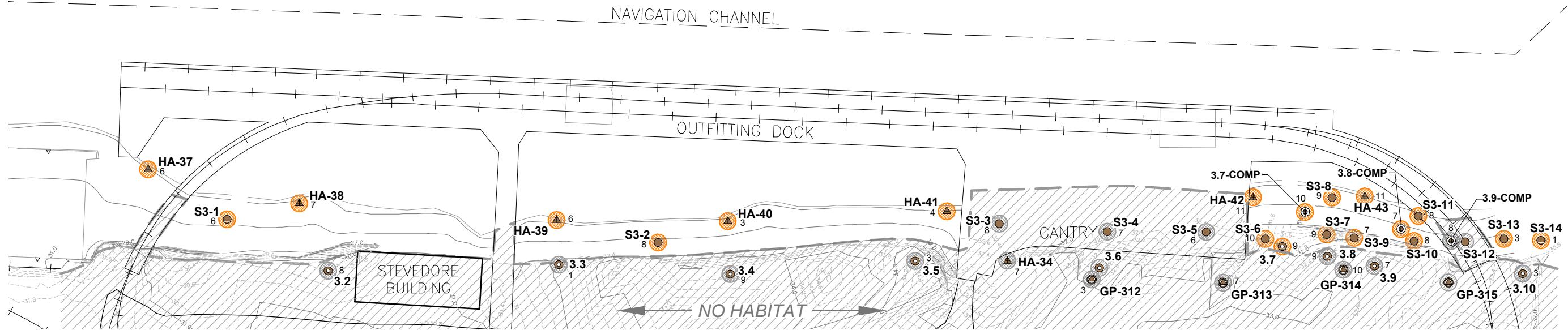
Human Health Upland Screening Summary - Dioxins/Furans

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number 1935-03	Figure D-13
		June 2014

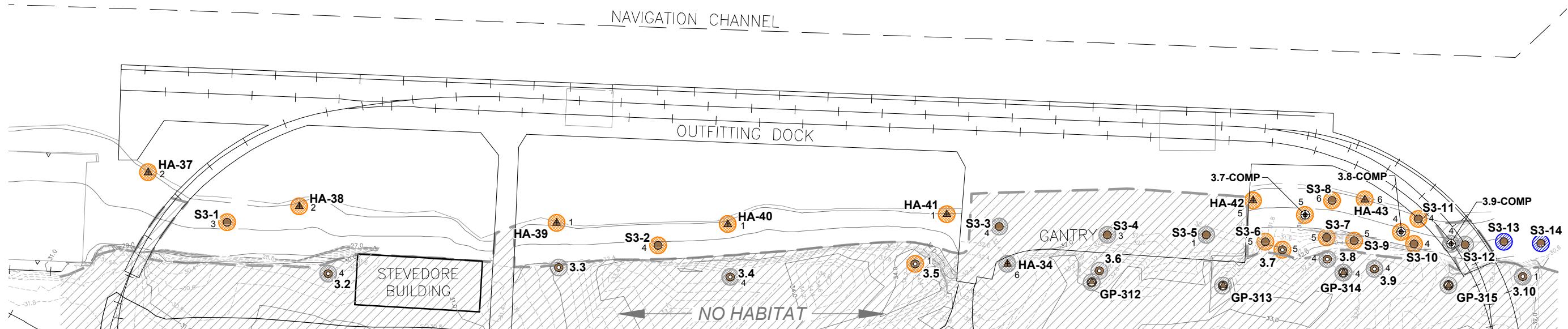
Screening Levels

WILLAMETTE RIVER



Hot Spots

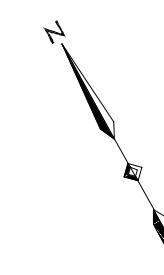
WILLAMETTE RIVER



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Sediment Screening Level or Hot Spot Concentration
(Total Number of Metals Detected Above the Applicable Screening Level)
- Does Not Exceed Ecological Sediment Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Terrestrial Ecological Screening Summary - Metals

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



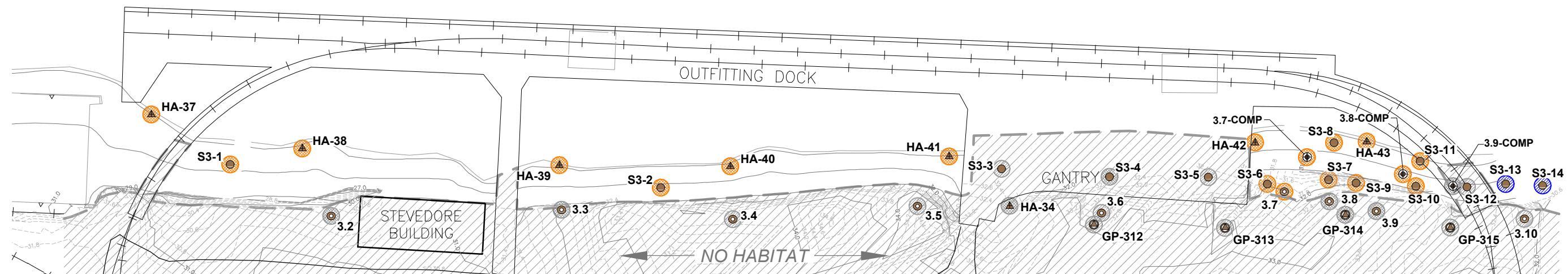
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-14

Screening Levels

WILLAMETTE RIVER

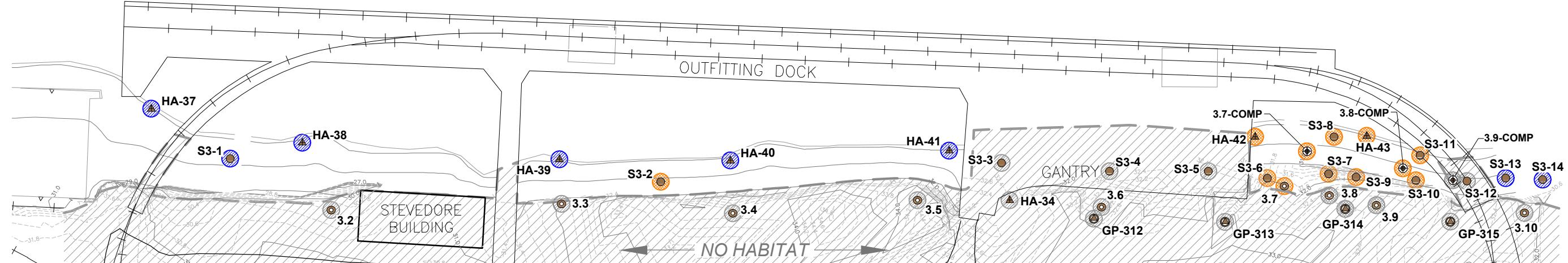
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

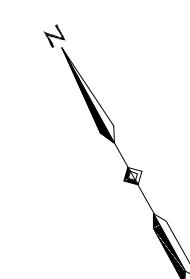
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓛ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓛ Geoprobe Location
- Exceeds Ecological Soil Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Terrestrial Ecological Screening Summary - Total Polychlorinated Biphenyls

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



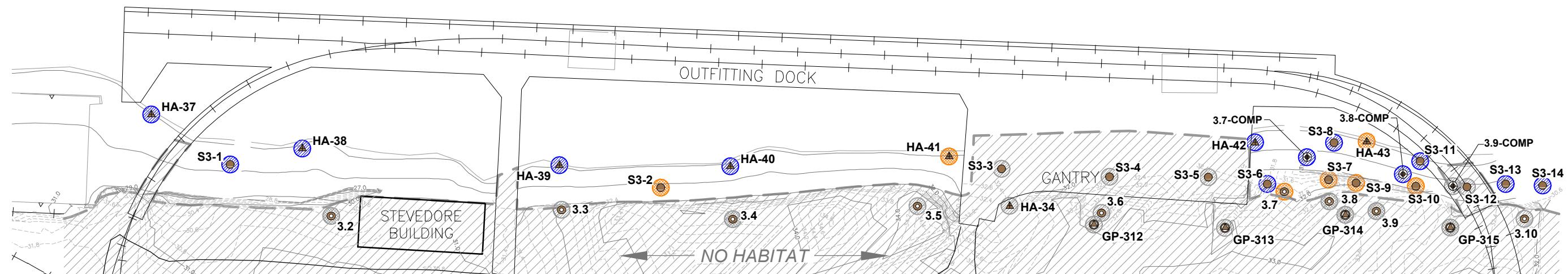
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-15

Screening Levels

WILLAMETTE RIVER

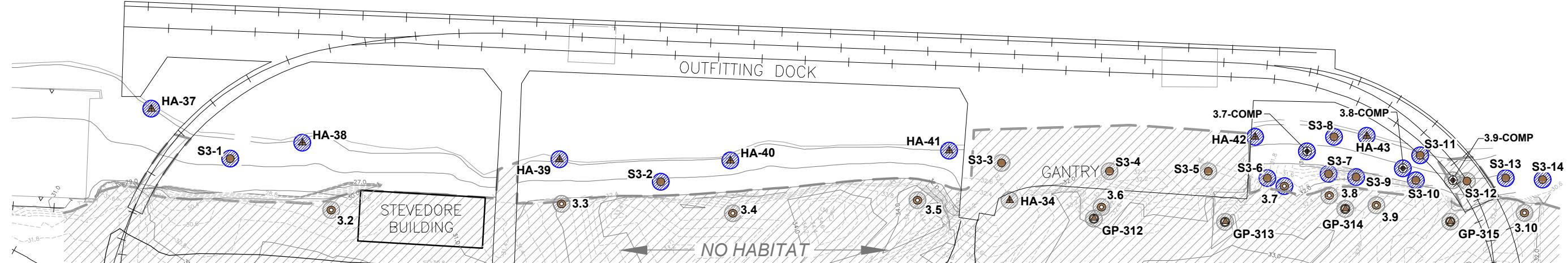
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

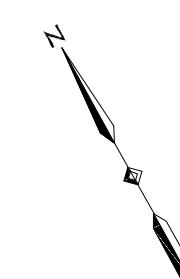
NAVIGATION CHANNEL



Legend:

- 3.10 (●) Vector Borehole Location
- S3-14 (●) Riverbank Surface Sample Location
- 3.9-COMP (⊕) Composite Riverbank Sample Location
- HA-41 (▲) Surface Sediment Station Location
- GP-314 (◎) Geoprobe Location
- Exceeds Ecological Soil Screening Level or Hot Spot Concentration (Orange Circle)
- Does Not Exceed Ecological Soil Screening Level or Hot Spot Concentration (Blue Circle)

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Terrestrial Ecological Screening Summary - Polycyclic Aromatic Hydrocarbons

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



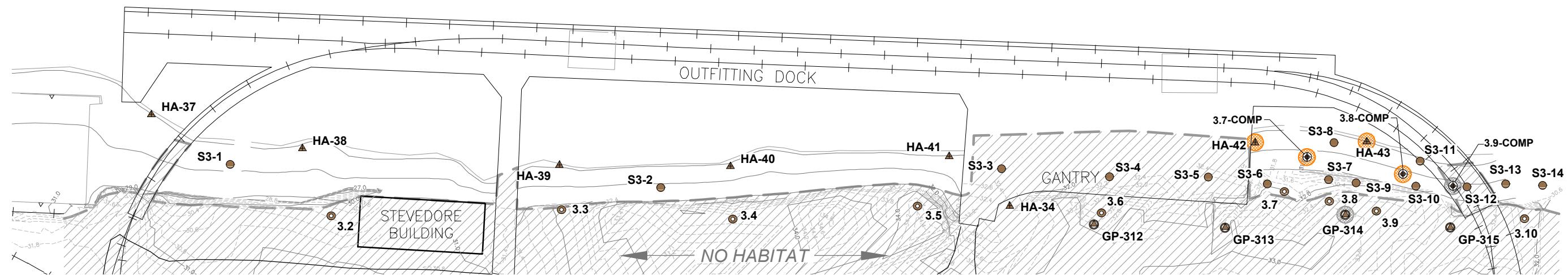
APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-16

Screening Levels

WILLAMETTE RIVER

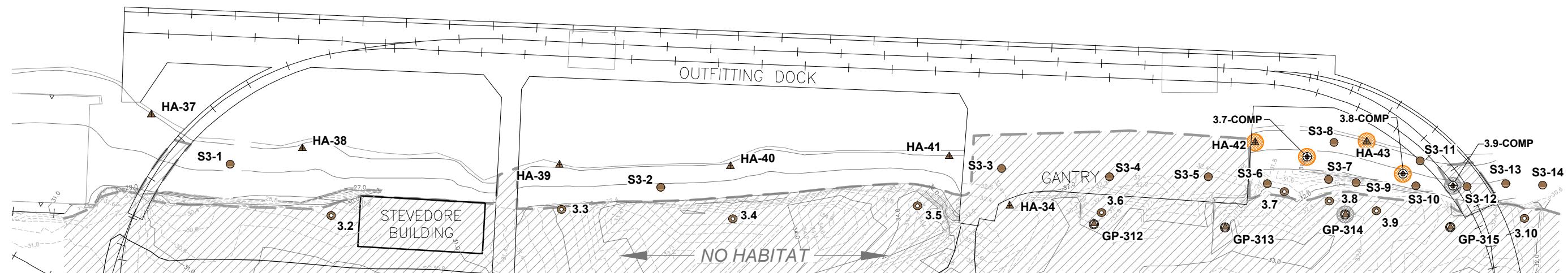
NAVIGATION CHANNEL



Hot Spots

WILLAMETTE RIVER

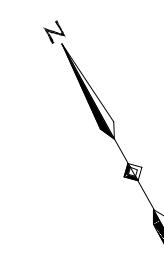
NAVIGATION CHANNEL



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓣ Geoprobe Location
- Exceeds Ecological Soil Screening Level or Hot Spot Concentration
- Does Not Exceed Ecological Soil Screening Level or Hot Spot Concentration

0 100 200
Scale in Feet



NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Terrestrial Ecological Screening Summary - Dioxins/Furans

Schnitzer ASD Yard Riverbank Feasibility Study
Gunderson, LLC
Portland, Oregon



APEX Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
June 2014		D-17

Appendix E

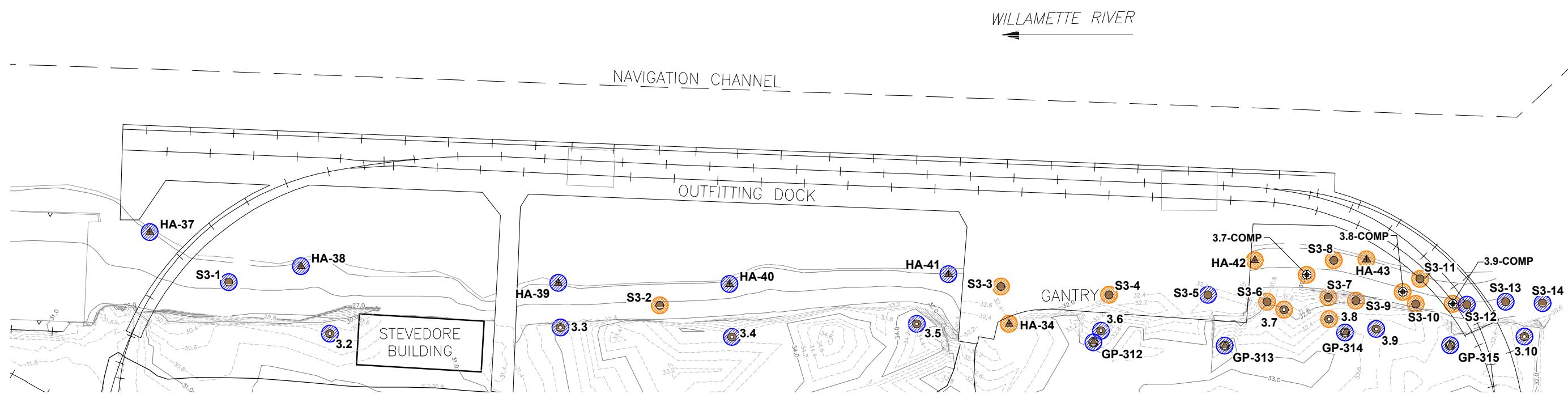
Preliminary Waste Designation Evaluation

Table E-1**Total Metals and TCLP Statistics****Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation****Gunderson, LLC. - Portland, Oregon**

	Total Concentrations (mg/kg)					TCLP Concentrations (mg/L)		TCLP Limits	
	Overall ¹		Samples for TCLP ²			Samples for TCLP			
	Max	Avg	No. Samples	Max	Avg	Max	Avg		
Arsenic	143	20	6	56	34	0.005	<0.0029	5	
Barium	985	253	3	554	364	2.51	1.7	100	
Cadmium	26.7	10	3	27	18	0.275	0.23	1	
Chromium	918	145	8	464	221	0.0431	<0.025	5	
Lead	4,160	924	16	3,700	1277	110	15.5	5	
Mercury	19	1.7	5	11	4.0	ND	ND	0.2	
Selenium	28	1.2	3	28	9.8	<0.00092	<0.00092	1	
Silver	5.5	1.3	3	2.0	1.0	<0.00018	<0.00018	5	

Notes:

1. Statistics for Overall samples associated with surface sample and boring samples.
2. Statistics for Total Concentrations/Samples for TCLP limited to those surface samples/boring samples that also had TCLP analyses.
3. **Bolded** values represent TCLP concentrations that exceed limits.



Legend:

- 3.10 ● Vector Borehole Location
- S3-14 ● Riverbank Surface Sample Location
- 3.9-COMP Ⓢ Composite Riverbank Sample Location
- HA-41 ▲ Surface Sediment Station Location
- GP-314 Ⓢ Geoprobe Location
- Lead >1,000 mg/kg
- Lead <1,000 mg/kg

0 100 200
Scale in Feet

NOTES:

- 1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
- 2) Surface Sediment Stations and Navigation Channel from Map 2.1-1m and Map 2.2-2m provided by Integral Consulting and LWG. All locations and features are approximate.
- 3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Total Lead Greater Than 1,000 mg/kg

Schnitzer ASD Yard Riverbank
Source Control Measures Feasibility Study
Gunderson, LLC
Portland, Oregon

APEX	Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number 1935-03	Figure E-1
			April 2014

TABLE 14
Leachable Metals Analysis

milligrams per kilogram (Mg/Kg) for total concentrations
milligrams per liter (mg/L) for leachate concentrations

	HA-37	HA-37	HA-38	HA-38	HA-39	HA-39	HA-40	HA-40	HA-41	HA-42	HA-42	HA-43	HA-43	GP-316	GP-316	RCRA Action Level	Oregon Soclean
	0.5	2.5	0.5	1.5	0.5	2	0.5	2	0.5	0.5	2	0.5	2.5	0.5	2.5		
total antimony	9.87	1.46	21.9	10.1	4.92	7.82	3.53	0.494	2.24	7.44	47	18	55.1	301	628		
leachable antimony														0.0762	0.436		
total arsenic	28.8	7.37	43.2	43.3	6.35	8.22	8.42	3.61	4.68	19.4	40.7	24.4	27	47.7	60	100	0.08
leachable arsenic												ND	ND	ND	ND	5	0.004
total cadmium	0.458	ND	1.17	0.895	ND	1.29	ND	ND	0.857	6.29	26.7	9.3	18.7	26.3	27.8	20	10
leachable cadmium											0.236	0.124	0.24	0.275	0.27	1	0.5
total chromium	47.6	102	119	80.5	89.8	67.4	49.2	21.2	35.3	142	464	194	259	557	709	100	200
leachable chromium		ND		ND							ND	ND	ND	ND	ND	5	10
total copper	264	67.8	768	637	174	275	87	42.3	126	333	1,990	1,370	1,760	2,660	428	2,000	
leachable copper											2.74	4.2	6.96	1.78	ND	100	
total lead	561	114	673	398	406	437	816	109	242	591	2,650	1,030	2,950	5,230	4,870	100	40
leachable lead	0.468	ND	2.27	2.36	0.158	5.33	0.739	ND	ND	ND	25.8	15.7	12.7	7.76	2.2	5	2
total mercury	0.189	0.089	0.308	0.265	0.694	1	0.26	0.122	0.307	0.483	4.57	0.99	10.6	17.2	3.41	4	4
leachable mercury											ND		ND	ND	ND	0.2	0.2
total zinc	1,010	234	1,380	1,190	1,560	1,000	530	152	564	1,290	9,000	4,220	5,020	17,400	17,900		
leachable zinc											93.3	25.8	70.9	57.3	65.2		

Table 15
 Comparison of Riverbank Surface Sample TCLP Metals Results to RCRA TCLP Hazardous Waste Thresholds
 S3-3, S3-4 and S3-8
 Area 3 Erodible and Riverbank Soil Source Control Evaluation
 Gunderson, LLC - Portland, Oregon

Group	Constituent	Units	Analytical Method	RCRA TCLP Threshold	S3-3		S3-4		S3-8										
Sample Date					10/15/2010		10/15/2010		10/15/2010										
					Result	Flag	Result	Flag	Result	Flag									
Inorganics	Mercury	mg/L	TCLP Metals 1311/6000/7000	0.2	0.0000590	U	0.0000590	U	0.0000590	U									
	Arsenic	mg/L	TCLP Metals 1311/6000/7000	5	0.00130	J	0.00210	J	0.00530	J									
	Barium	mg/L	TCLP Metals 1311/6000/7000	100	1.78		0.810		2.51										
	Chromium	mg/L	TCLP Metals 1311/6000/7000	5	0.00844	U	0.0431		0.0226										
	Copper	mg/L	TCLP Metals 1311/6000/7000	---	0.595		0.0856		1.79										
	Lead	mg/L	TCLP Metals 1311/6000/7000	5	110		0.626		46.5										
	Manganese	mg/L	TCLP Metals 1311/6000/7000	---	3.38		2.11		19.3										
	Nickel	mg/L	TCLP Metals 1311/6000/7000	---	0.196		0.0724		1.07										
	Selenium	mg/L	TCLP Metals 1311/6000/7000	1	0.000920	U	0.000920	U	0.000920	U									
	Silver	mg/L	TCLP Metals 1311/6000/7000	5	0.000180	U	0.000180	U	0.000180	U									
Notes:																			
RCRA TCLP Threshold = Resource Conservation and Recovery Act Toxicity Characteristic Leaching Procedure Threshold for Total Metals																			
mg/L = milligrams per Liter																			
--- No applicable threshold value																			
J = the result is an estimated quantity																			
U = undetected at the method detection limit shown																			

Appendix F

ARARs: Table 3.4-1 from Draft Portland Harbor Feasibility Study

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Federal ARARs			
Clean Water Act, Section 404 and Section 404(b)(1) Guidelines	33 USC 1344, 40 CFR Part 230	Regulates discharge of dredged and fill material into navigable waters of the United States.	Action-specific. Applicable to dredging, covering, capping, and designation and construction of in-water disposal sites and in-water filling activities in the Willamette River.
Clean Water Act	33 USC 1313, 1314 Most recent 304(a) list, as updated up to issuance of the ROD	Under Section 304(a), minimum criteria are developed for water quality programs established by states. Two kinds of water quality criteria are developed: one for protection of human health, and one for protection of aquatic life.	Chemical-specific and Action-specific. Relevant and appropriate for cleanup standards for surface water and contaminated groundwater discharging to surface water if more stringent than promulgated state criteria. Relevant and Appropriate to short-term impacts to surface water from implementation of the remedial action that result in a discharge to navigable water, such as dredging and capping if more stringent than promulgated state criteria.
Clean Water Act, Section 401	33 USC 1341, 40 CFR Section, 121.2(a)(3), (4) and (5)	Any federally authorized activity which may result in any discharge into navigable waters requires reasonable assurance that the action will comply with applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of the Clean Water Act.	Action-specific. Relevant and Appropriate to implementation of the remedial action that results in a discharge to the river if more stringent than state implementation regulations.
Clean Water Act, Section 402	33 USC 1342	Regulates discharges of pollutants from point sources to waters of the U.S., and requires compliance with the standards, limitations and regulations promulgated per Sections 301, 304, 306, 307, 308 of the CWA.	Relevant and Appropriate to remedial activities that result in a discharge of pollutants from point sources to the river if more stringent than state promulgated point source requirements.
Safe Drinking Water Act	42 USC 300f, 40 CFR Part 141, Subpart O, App. A. 40 CFR Part 143	Establishes national drinking water standards to protect human health from contaminants in drinking water	Chemical-specific Relevant and Appropriate as a performance standard for groundwater and surface water which are potential drinking water sources.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Resource Conservation and Recovery Act	40 CFR 260, 261	Establishes identification standards and definitions for material is exempt from the definition of a hazardous waste.	Action-specific. Applicable to characterizing wastes generated from the action and designated for off-site or upland disposal; potentially relevant and appropriate for use in identifying acceptance criteria for confined in-water disposal.
RCRA – Solid Waste	40 CFR 257 Subpart A		RCRA Solid Waste requirements may be relevant and appropriate to remedial actions that result in upland or in-water disposal of dredged material. Requirements for the management of solid waste landfills may be relevant and appropriate to upland disposal.
Hazardous Materials Transportation Act	49 USC §5101 et seq. 40 CFR Parts 171-177		Hazardous Materials Transportation Act requirements are applicable to remedial actions that involve the transport of hazardous materials (i.e., dredged material)
Fish and Wildlife Coordination Act Requirements	16 USC 662, 663 50 CFR 6.302(g)	Requires federal agencies to consider effects on fish and wildlife from projects that may alter a body of water and mitigate or compensate for project-related losses, which includes discharges of pollutants to water bodies.	Action-specific. Potentially applicable to determining impacts and appropriate mitigation, if necessary, for effects on fish and wildlife from filling activities or discharges from point sources.
Magnuson-Stevens Fishery Conservation and Management Act	50 CFR Part.600.920	Evaluation of impacts to Essential Fish Habitat (EFH) is necessary for activities that may adversely affect EFH.	Location-specific. Potentially applicable if the removal action may adversely affect EFH.
Federal Emergency Management Act	44 CFR 60.3(d)(2) and (3)		FEMA flood rise requirements are considered relevant and appropriate requirements for remedial actions.
River and Harbors Act	33 USC 401 et seq. 33 CFR parts 320 to 323	Section 10 prohibits the unauthorized obstruction or alteration of any navigable water. Structures or work in, above, or under navigable waters are regulated under Section 10.	Action-specific. Applicable requirements for how remedial actions are taken or constructed in the navigation channel.
Clean Air Act	42 USC §7401 et seq.		Action-specific. Applicable to remedial activities that generate air emissions.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Toxic Substances Control Act	15 USC §2601 et seq.		Chemical-specific. TSCA requirements are applicable to contaminated material or surface water with PCB contamination
Marine Mammal Protection Act	16 USC §1361 et seq. 50 CFR 216		Action-specific. Applicable to remedial actions that have the potential to affect marine mammals.
Migratory Bird Treaty Act	16 USC §703 50 CFR §10.12	Makes it unlawful to take any migratory bird. “Take” is defined as pursuing, hunting, wounding, killing, capturing, trapping and collecting.	Action-specific. Applicable to remedial actions that have the potential to effect a taking of migratory birds.
National Historic Preservation Act	16 USC 470 et seq. 36 CFR Part 800	Requires the identification of historic properties potentially affected by the agency undertaking, and assessment of the effects on the historic property and seek ways to avoid, minimize or mitigate such effects. Historic property is any district, site, building, structure, or object included in or eligible for the National Register of Historic Places, including artifacts, records, and material remains related to such a property.	Action-specific. Potentially applicable if historic properties are potentially affected by remedial activities.
Archeological and Historic Preservation Act	16 USC 469a-1	Provides for the preservation of historical and archeological data that may be irreparably lost as a result of a federally-approved project and mandates only preservation of the data	Action-specific. Potentially applicable if historical and archeological data may be irreparably lost by implementation of the remedial activities.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Native American Graves Protection and Reparation Act	25 USC 3001-3013 43 CFR 10	Requires Federal agencies and museums which have possession of or control over Native American cultural items (including human remains, associated and unassociated funerary items, sacred objects and objects of cultural patrimony) to compile an inventory of such items. Prescribes when such Federal agencies and museums must return Native American cultural items. "Museums" are defined as any institution or State or local government agency that receives Federal funds and has possession of, or control over, Native American cultural items.	Location-specific; action-specific. If Native American cultural items are present on property belonging to the Oregon Division of State Lands (DSL) that is a part of the removal action area, this requirement is potentially applicable. If Native American cultural items are collected by an entity which is either a federal agency or museum, then the requirements of the law are potentially applicable.
Endangered Species Act	16 USC 1531 et seq. 50 CFR 17	Actions authorized, funded, or carried out by federal agencies may not jeopardize the continued existence of endangered or threatened species or adversely to avoid jeopardy or take appropriate mitigation modify or destroy their critical habitats. Agencies are to avoid jeopardy or take appropriate mitigation measures to avoid jeopardy.	Action-specific. Applicable to remedial actions, that may adversely impact endangered or threatened species or critical habitat that are present at the site.
Executive Order for Wetlands Protection	Executive Order 11990 (1977) 40 CFR 6.302 (a) 40 CFR Part 6, App. A	Requires measures to avoid adversely impacting wetlands whenever possible, minimize wetland destruction, and preserve the value of wetlands.	Location-specific. Relevant and appropriate in assessing impacts to wetlands, if any, from the response action and for developing appropriate compensatory mitigation for the project.
Executive Order for Floodplain Management	Exec. Order 11988 (1977) 40 CFR Part 6, App. A 40 CFR 6.302 (b)	Requirements for Flood Plain Management Regulations Areas Requires measures to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	Location-specific. Relevant and appropriate for assessing impacts, if any, to the floodplain and flood storage from the response action and developing compensatory mitigation that is beneficial to floodplain values.
National Flood Insurance Act and Flood Disaster Protection Act	42 USC 4001 et seq. 44 CFR National Flood Insurance Program Subpart A	Requirements for Flood Plain Management Regulations Areas Requires measures to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	Location-specific. Relevant and appropriate for assessing impacts, if any, to the floodplain and flood storage from the response action and developing compensatory mitigation that is beneficial to floodplain values.

DO NOT QUOTE OR CITE:

**This document is currently under review by US EPA and its federal, state, and tribal partners
and is subject to change in whole or in part.**

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
State ARARs			
Oregon Environmental Cleanup Law ORS 465.315.	Oregon Hazardous Substance Remedial Action Rules OAR 340-122-0040(2)(a) and (c), 0115(3),(32) and (51).	Sets standards for degree of cleanup required, including for oil and other petroleum products/wastes. Establishes acceptable risk levels for human health at 1×10^{-6} for individual carcinogens, 1×10^{-5} for multiple carcinogens, and Hazard Index of 1 for noncarcinogens; and protection of ecological receptors at the individual level for threatened or endangered species and the population level for all others. OAR 340-122-0040 and 0115(3).	Chemical-specific: a risk-based numerical value that, when applied to site-specific conditions, will establish concentrations of hazardous substances that may remain or be managed on-site in a manner avoiding unacceptable risk.
	OAR 340-122-and (b), 340-122-0040(4) 0115(32)	For hot spots of contamination in water, requires treatment, if feasible, when treatment would be reasonably likely to restore or protect beneficial uses within a reasonable time. For hot spots contamination of sediments, requires treatment or excavation and off-site disposal of hazardous substances if treatment is reasonably likely to restore or protect such beneficial uses within a reasonable time.	Chemical-specific and action-specific: when contaminant concentrations fall within the definition of "hot spot" set forth in subpart 0115(32), treatment (including excavation and offsite disposal) of contaminated media to levels below such risk levels or beneficial-use impacts needs to be evaluated in the feasibility study.
Hazardous Waste and Hazardous Materials II	ORS 466.005(7) OAR 340-102-0011 - Hazardous Waste Determination	Defines "Hazardous Waste" and the rule contains the criteria by which anyone generating residue must determine if that residue is a hazardous waste.	Chemical- and Action-specific: specifies substantive requirements if remedial action will involve on-site treatment, disposal, or storage of RCRA-listed or characteristic hazardous waste. (Note: off-site treatment, storage, or disposal subject to all administrative and substantive state requirements.)
	Identification and Listing of Hazardous Waste OAR 340-101-0033	Identifies additional residuals that are subject to regulation as hazardous waste under state law.	Action-specific: specifies requirements if remedial action will involve on-site treatment, disposal, or storage of additional listed wastes.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Solid Waste: General Provisions	Specific regulatory references to be provided by DEQ when alternatives are identified for FS analysis	Substantive Requirements for the location, design, construction, operation, and closure of solid waste management facilities.	Action-specific: applicable if upland disposal facility contemplated on-site for solid, nonhazardous, waste disposal, handling, treatment, or transfer. (Note: off-site transfer, treatment, handling, or disposal subject to all administrative and substantive state requirements.)
	Solid Waste: Land Disposal Sites Other than Municipal Solid Waste Landfills, specific regulatory references to be supplied by DEQ	Requirements for the management of solid wastes at land disposal sites other than municipal solid waste landfills.	Action-specific: applicable to the on-site management and disposal of contaminated sediment, soil, and/or groundwater.
Water Pollution Control Act ORS 468B.048	Water Quality Standards OAR 340-041-0340, Table 20 and Table 33A	DEQ is authorized to administer and enforce CWA program in Oregon. DEQ rules designate beneficial uses for water bodies and narrative and numeric water quality criteria necessary to protect those uses. OAR 340-041-0340 designates and defines the beneficial uses that shall be protected in the Willamette Basin. For the purposes of state law, Table 20 are the applicable criteria, unless there is a corresponding criterion under Table 33A, in which case Table 33A is applicable. (Note: if Oregon promulgates new criteria prior to ROD, such new criteria will be ARAR).	Chemical- and action-specific: applicable to any discharges to surface water from point sources, groundwater, overland flow of stormwater, and activities that may result in discharges to waters of the state, such as, dredge and fill, de-watering sediments, and other remedial activities. Relevant and appropriate as performance standards for sites and where contaminants are left in place.
Water Pollution Control Act ORS 468B.048	Regulations Pertaining to NPDES Discharges Specific regulatory references to be supplied by DEQ	Effluent limitations and management practices for point-source discharges into waters of the state (otherwise subject to NPDES permit but for on-site permit exemption).	Chemical- and Action-specific: applies state water quality standards and effluent limitations to point-source discharges to the Willamette River.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
	Certification of Compliance with Water Quality Requirements and Standards ORS 468b.035	Provides that federally-approved activities that may result in a discharge to waters of the State requires evaluation whether an activity may proceed and meet water quality standards with conditions, which if met, will ensure that water quality standards are met.	Action-specific: Applicable to implementation of the remedial action (e.g., dredging, capping, and construction of confined disposal facility) that may result in a discharge to waters of the State.
	Rules Governing the Issuance and Enforcement of Removal-Fill Authorizations within Waters of Oregon Including Wetlands OAR 141-085 0680, 141-085-0695, 141-085-0710, 141-085-0765	Substantive requirements for dredge and fill activities in waters of the state, including in designated Essential Indigenous Anadromous Salmonid Habitat.	Action-specific: Applicable to remedial action dredge and fill activities, capping, and riverbank remediation.
ODFW Fish Management Plans for the Willamette River	OAR 635, div 500	Provides basis for in-water work windows in the Willamette River.	Action-specific. Potentially applicable to timing of implementation of the remedial action due to presence of protected species at the site.
Oregon Air Pollution Control ORS 468A et. seq.	General Emissions Standards OAR 340-226	DEQ is authorized to administer and enforce Clean Air program in Oregon. Rules provide general emission standards for fugitive emissions of air contaminants and require highest and best practicable treatment or control of such emissions.	Action-specific: applicable to remedial actions taking place in on-site uplands. Could apply to earth-moving equipment, dust from vehicle traffic, and mobile-source exhaust, among other things.
Oregon Air Pollution Control ORS 468A et. seq.	Fugitive Emission Requirements OAR 340-208	Prohibits any handling, transporting, or storage of materials, or use of a road, or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. These rules for “special control areas” or other areas where fugitive emissions may cause nuisance and control measures are practicable.	Action-specific: applicable to remedial actions taking place in on-site uplands. Could apply to earth-moving equipment, dust from vehicle traffic, and mobile-source exhaust, among other things

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Indian Graves and Protected Objects ORS 97.740-760		<p>Prohibits willful removal of cairn, burial, human remains, funerary object, sacred object or object of cultural patrimony. Provides for reinterment of human remains or funerary objects under the supervision of the appropriate Indian tribe. Proposed excavation by a professional archeologist of a native Indian cairn or burial requires written notification to the State Historic Preservation Officer and prior written consent of the appropriate Indian tribe.</p> <p>Prohibits persons from excavating, injuring, destroying or damaging archeological sites or objects on public or private lands unless authorized.</p>	
Archeological Objects and Sites ORS 358.905-955 ORS 390.235		Imposes conditions for excavation or removal of archeological or historical materials.	Location-specific; action-specific. Potentially relevant and appropriate if archeological material encountered.
	Survival Guidelines OAR 635-100-0135	Survival Guidelines are rules for state agency actions affecting species listed under Oregon's Threatened or Endangered Wildlife Species law.	Action-and location specific: Substantive requirements of Survival Guidelines relevant and appropriate to remedial activities affecting state-listed species.
Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment DEQ, 2007		Describes a process to evaluate chemicals found in sediment for their potential contribution to risk as a result of bioaccumulation. Provides alternative methods for developing sediment screening levels and bioaccumulation bioassay data.	To be Considered: in level of cleanup or standard of control that is protective.

DO NOT QUOTE OR CITE:

This document is currently under review by US EPA and its federal, state, and tribal partners
 and is subject to change in whole or in part.

Appendix G

Quantity Calculations

Cap Alternative Option 1 - 1.5H:1V

Station	Distance (ft)	Length (ft)	Total Area		Cut		Debris (Assume 10%)		Fill Below 100-Yr Floodplain (~El. 32 Ft)		Common Fill		Rip Rap			Select Fill			Topsoil			Demarcation Fabric		Jute Mat/Planting		Area Loss				
			Width (ft)	Area (sf)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Area (sf)	Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Width (ft)	Area (sy)	Width (ft)	Area (ac)		
Downstream Boundary	0	20	70	1400	0	0	0	0	206	153	0	0	1.5	60	90	67	--	--	146	108	2	25	50	37	70	156	25	56	25	0.0
Begin Dock Access	20	50	50	2500	0	0	0	0	120	222	0	0	--	--	120	222	1.5	25	37.5	69	0	0	0	0	25	139	0	0	0	0.0
End Dock Access	70	150	70	10500	0	0	0	0	206	1144	0	0	1.5	60	90	500	--	--	146	811	2	25	50	278	70	1167	25	417	25	0.1
Begin Stevedore Building	220	140	50	7000	0	0	0	0	220	1141	0	0	--	--	220	1141	1.5	25	37.5	194	0	0	0	0	25	389	0	0	0	0.0
End Stevedore Building	360	0	40	0	0	0	0	0	206	0	0	0	0	--	--	0	1.5	25	37.5	0	0	0	0	25	0	0	0	0	0.0	
Begin Dock Access	360	40	40	1600	0	0	0	0	135	200	0	0	--	--	135	200	1.5	25	37.5	56	0	0	0	0	25	111	0	0	0	0.0
End Dock Access	400	380	70	26600	0	0	0	0	206	2899	0	0	1.5	60	90	1267	--	--	146	2055	2	25	50	704	70	2956	25	1056	25	0.2
Begin Gantry	780	280	40	11200	0	0	0	0	150	1556	0	0	--	--	150	1556	1.5	25	37.5	389	0	0	0	0	25	778	0	0	0	0.0
End Gantry	1060	160	70	11200	0	0	0	0	206	1221	0	0	1.5	60	90	533	--	--	146	865	2	25	50	296	70	1244	25	444	25	0.1
Begin Dock Access	1220	110	30	3300	0	0	0	0	150	611	0	0	--	--	150	611	1.5	25	37.5	153	0	0	0	0	25	306	0	0	0	0.0
End Dock Access	1330	0	30	0	0	0	0	0	0	0	0	0	0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
Upstream Boundary	1330																													
Totals			75300	0	0	0	0	9147	0	0	0	0	0	0	0	6096	0	0	4700	0	1315	0	7244	0	1972	0	0.4	0.4 ac		
Total Fill	12111																													
Net Fill	12111																													

Focused Removal and Cap Alternative Option 1 - 1.5H:1V

Station	Distance (ft)	Length (ft)	Total Area		Cut		Debris (Assume 10%)		Removal		Fill Below 100-Yr Floodplain (~El. 32 Ft)		Common Fill		Rip Rap				Select Fill				Topsoil				Demarcation Fabric		Jute Mat/Planting		Area Loss	
			Width (ft)	Area (sf)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Width (ft)	Area (sy)	Width (ft)	Area (sy)	Width (ft)	Area (ac)
Downstream Boundary	0	20	70	1400	0	0	0	0	0	0	206	153	0	0	1.5	60	90	67	--	--	146	108	2	25	50	37	70	156	25	56	25	0.0
Begin Dock Access	20	50	50	2500	0	0	0	0	0	0	120	222	0	0	--	--	120	222	1.5	25	37.5	69	0	0	0	0	25	139	0	0	0	0.0
End Dock Access	70	150	70	10500	0	0	0	0	0	0	206	1144	0	0	1.5	60	90	500	--	--	146	811	2	25	50	278	70	1167	25	417	25	0.1
Begin Stevedore Building	220	140	50	7000	0	0	0	0	0	0	220	1141	0	0	--	--	220	1141	1.5	25	37.5	194	0	0	0	0	25	389	0	0	0	0.0
End Stevedore Building	360	0	40	0	0	0	0	0	0	0	206	0	0	0	0	0	0	0	1.5	25	37.5	0	0	0	0	25	0	0	0	0	0.0	
Begin Dock Access	360	40	40	1600	0	0	0	0	0	0	135	200	0	0	--	--	135	200	1.5	25	37.5	56	0	0	0	0	25	111	0	0	0	0.0
End Dock Access	400	380	70	26600	0	0	0	0	0	0	206	2899	0	0	1.5	60	90	1267	--	--	146	2055	2	25	50	704	70	2956	25	1056	25	0.2
Begin Gantry	780	280	40	11200	0	0	0	0	0	0	150	1556	0	0	--	--	150	1556	1.5	25	37.5	389	0	0	0	0	25	778	0	0	0	0.0
End Gantry	1060	160	70	11200	0	0	18	107	180	1067	206	1221	0	0	1.5	60	90	533	--	--	146	865	2	25	50	296	70	1244	25	444	25	0.1
Begin Dock Access	1220	110	30	3300	0	0	0	0	0	0	150	611	0	0	--	--	150	611	1.5	25	37.5	153	0	0	0	0	25	306	0	0	0	0.0
End Dock Access	1330	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0			
Upstream Boundary	1330																															
Totals				75300			0		107		1067		9147		0			6096			4700			1315		7244		1972		0.4		
Total Fill				12111																											0.4 ac	
Net Fill				10938																												
Fill Below Structures 2589																																

Focused Removal and Cap Alternative Option 2 - 3H:1V

Station	Distance (ft)	Length (ft)	Total Area		Cut		Debris (Assume 10%)		Removal		Fill Below 100-Yr Floodplain (~El. 32 Ft)		Common Fill		Rip Rap				Select Fill				Topsoil				Demarcation Fabric		Jute Mat/Planting		Area Loss	
			Width (ft)	Area (sf)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Width (ft)	Area (sy)	Width (ft)	Area (sy)	Width (ft)	Area (ac)
Downstream Boundary	0	20	80	1600	0	0	0	0	0	0	120	89	0	0	--	--	120	89	1.5	25	37.5	28	0	0	0	0	25	56	0	0	0	0.0
Begin Dock Access	20	50	80	4000	0	0	0	0	0	0	120	222	0	0	--	--	120	222	1.5	25	37.5	69	0	0	0	0	25	139	0	0	0	0.0
End Dock Access	70	150	160	24000	110	611	11	61	0	0	320	1778	170	944	1.5	75	112.5	625	1.5	75	112.5	625	2	85	170	944	160	2667	85	1417	73	0.3
Begin Stevedore Building	220	140	50	7000	0	0	0	0	0	0	220	1141	0	0	--	--	220	1141	1.5	25	37.5	194	0	0	0	0	25	389	0	0	0	0.0
End Stevedore Building	360	0	40	0	0	0	0	0	0	0	135	0	0	0	0	0	0	0	1.5	25	37.5	0	0	0	0	25	0	0	0	0	0.0	
Begin Dock Access	360	40	40	1600	0	0	0	0	0	0	135	200	0	0	--	--	135	200	1.5	25	37.5											

Removal Alternative Option 1 - 1.5H:1V

Station	Distance (ft)	Length (ft)	Total Area		Removal			Removal Volume Beneath Structures (included in total removal at left)				Fill Below 100-Yr Floodplain (~El. 32 Ft)			Common Fill		Rip Rap			Select Fill			Topsoil			Demarcation Fabric	Jute Mat/Planting	Area Loss						
			Width (ft)	Area (sf)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Width (ft)	Area (sf)	Width (ft)	Area (sf)	Width (ft)	Area (ac)		
Downstream Boundary	0	20	60	1200	3	50	150	111	3	10	30	22	206	153	0	0	1.5	60	90	67	--	--	146	108	2	25	50	37	0	0	25	56	25	0.0
Begin Dock Access	20	50	120	6000	3	50	150	278	3	10	30	56	120	222	0	0	--	--	120	222	1.5	25	37.5	69	0	0	0	0	0	0	0	0.0		
End Dock Access	70	150	120	18000	3	50	150	833	--	--	0	0	206	1144	0	0	1.5	60	90	500	--	--	146	811	2	25	50	278	0	0	25	417	25	0.1
Begin Stevedore Building	220	140	30	4200	0	0	0	0	0	0	0	0	220	1141	0	0	--	--	220	1141	1.5	25	37.5	194	0	0	0	0	0	0	0	0.0		
End Stevedore Building	360	0	70	0	3	50	150	0	3	10	30	0	206	0	0	0	0	0	0	1.5	25	37.5	0	0	0	0	0	0	0	0.0				
Begin Dock Access	360	40	70	2800	3	50	150	222	3	10	30	44	135	200	0	0	--	--	135	200	1.5	25	37.5	56	0	0	0	0	0	0	0	0.0		
End Dock Access	400	380	120	45600	3	50	150	2111	--	--	0	0	206	2899	0	0	1.5	60	90	1267	--	--	146	2055	2	25	50	704	0	0	25	1056	25	0.2
Begin Gantry	780	280	40	11200	3	50	150	1556	3	10	30	311	150	1556	0	0	--	--	150	1556	1.5	25	37.5	389	0	0	0	0	0	0	0	0.0		
End Gantry	1060	160	120	19200	3	50	150	889	--	--	0	0	206	1221	0	0	1.5	60	90	533	--	--	146	865	2	25	50	296	0	0	25	444	25	0.1
Begin Dock Access	1220	110	50	5500	3	50	150	611	3	10	30	122	150	611	0	0	--	--	150	611	1.5	25	37.5	153	0	0	0	0	0	0	0	0.0		
End Dock Access	1330	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0				
Upstream Boundary	1330																																	
Totals				113700				6611				556		9147		0				6096				4700				1315		0		1972		0.4
Total Fill				12111																													0.4 ac	
Net Fill				5500																														

Asbestos debris (assume 1/3 of removal beneath Gantry) 104 Fill Below Structures 2589

Removal Alternative Option 2 - 3H:1V

Station	Distance (ft)	Length (ft)	Total Area		Removal			Removal Volume Beneath Structures (included in total removal at left)				Fill Below 100-Yr Floodplain (~El. 32 Ft)			Common Fill		Rip Rap			Select Fill			Topsoil			Demarcation Fabric	Jute Mat/Planting	Area Loss						
			Width (ft)	Area (sf)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Thickness (ft)	Width (ft)	X-Sect. Area (sf)	Volume (cy)	Width (ft)	Area (sf)	Width (ft)	Area (sf)	Width (ft)	Area (ac)		
Downstream Boundary	0	20	60	1200	3	50	150	111	3	10	30	22	120	89	0	0	--	--	120	89	3	40	120	89	0	0	0	0	0	0	0	0.0		
Begin Dock Access	20	50	120	6000	3	50	150	278	3	10	30	56	120	222	0	0	--	--	120	222	3	40	120	222	0	0	0	0	0	0	0	0.0		
End Dock Access	70	150	120	18000	--	--	240	1333	--	--	0	0	320	1778	320	1778	1.5	75	112.5	625	1.5	75	112.5	625	1	55	55	306	0	0	55	917	40	0.1
Begin Stevedore Building	220	140	30	4200	0	0	0	0	0	0	0	0	220	1141	0	0	--	--	220	1141	1.5	25	37.5	194	0	0	0	0	0	0	0	0.0		
End Stevedore Building	360	0	70	0	3	50	150	0	3	10	30	0	135	0	0	0	0	0	0	1.5	25	37.5	0	0	0	0	0	0	0	0.0				
Begin Dock Access	360	40	70	2800	3	50	150	222	3	10	30	44	135	200	0	0	--	--	135	200	1.5	25	157.5	233	0	0	0	0	0	0	0	0.0		
End Dock Access	400	380	120	45600	--	--	240	3378	--	--	0	0	320	4504	320	4504	1.5	75	112.5	1583	1.5	75	112.5	1583	1	55	55	774	0	0	55			